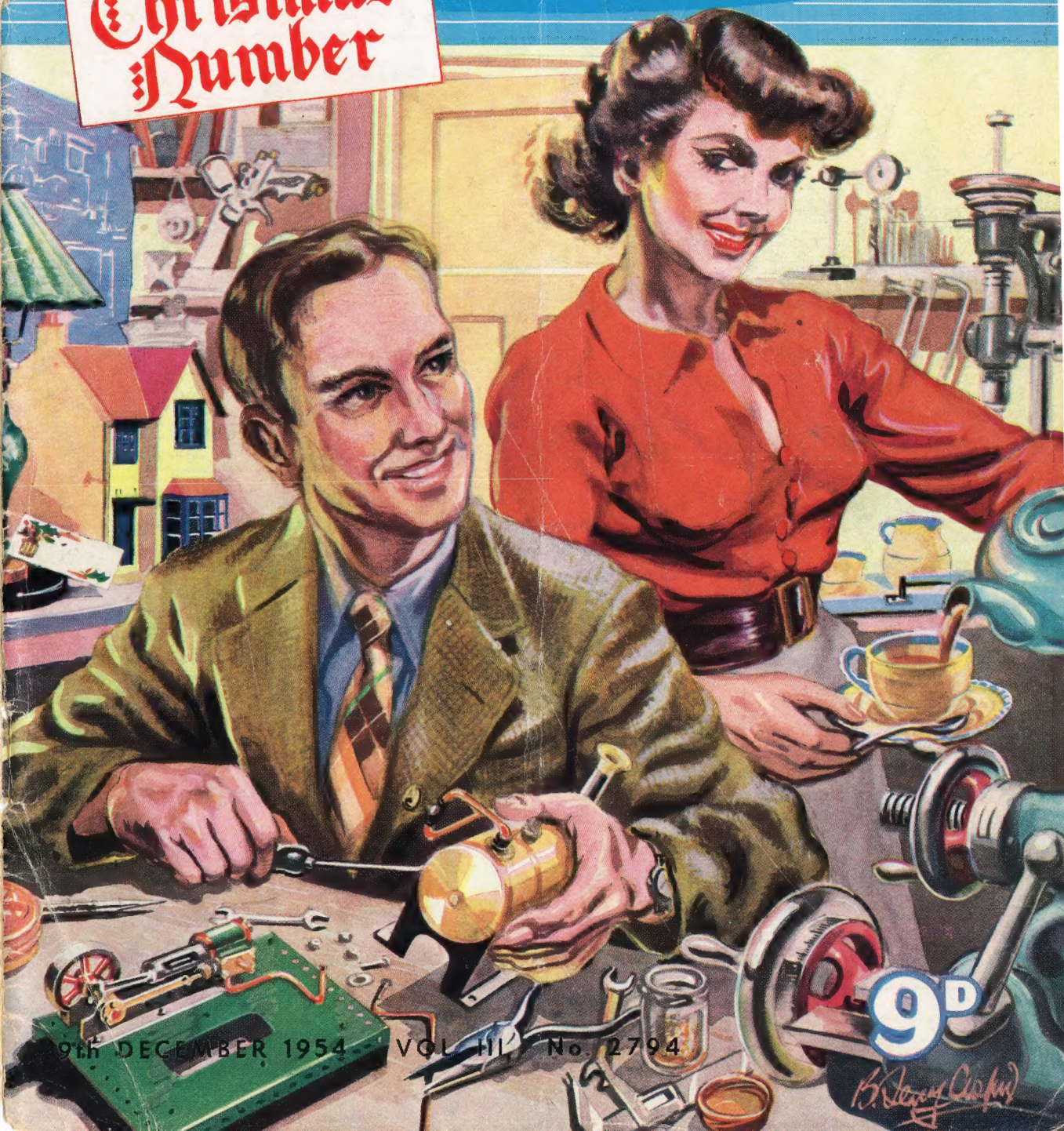


THE MODEL ENGINEER

Christmas
Number



9th DECEMBER 1954 VOL. III No. 2794

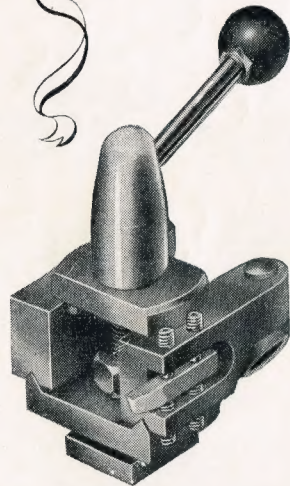
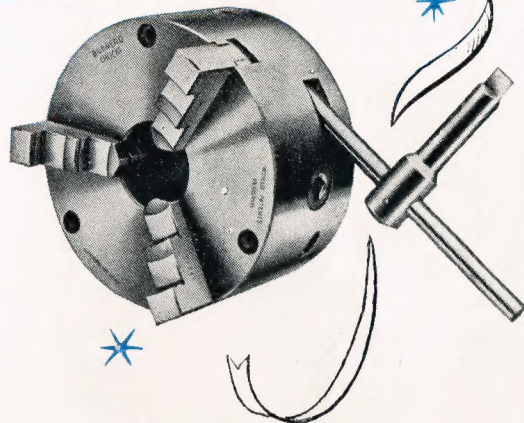
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B. J. C. (Chapman)

Make sure you get
**THE PRESENT
 OF A LIFETIME!**

This Christmas make sure *you* get the present you really want — a Burnerd GRIPTRU lathe chuck or a BURNERD Toolpost. Drop the family a hint and get them to club together to buy you one — or *both*, if you're especially lucky. If you should fail, give yourself the present of a lifetime that will last you a lifetime!

Many Burnerd stockists can help to make present-giving comparatively painless with convenient easy-payment terms.



**THE TOOLPOST THAT
 IS DIFFERENT**

The Burnerd toolpost makes any lathe a better lathe, for it enables you to change from one tool to another in as little as 2 seconds or less. It locates tools with high precision and absolute rigidity and enables an almost unlimited range of operations to be accomplished. No shims, no packing pieces, no loss of time or temper with . .

**THE BURNERD
 (PATENTED)
 TOOLPOST**

**THE WORLD'S MOST
 ACCURATE LATHE CHUCK**

The Burnerd Griptru lathe chuck with patented micro-adjustment system revolutionises previous ideas of accuracy, enabling concentricity adjustment to 0.0002 in. (two ten-thousandths of an inch) within two minutes. Built to the well-known Burnerd standard of quality. This versatile chuck is a present that will give you a lifetime's satisfaction. See that you get one this Christmas!

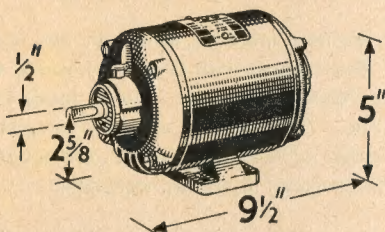
**THE BURNERD GRIPTRU
 LATHE CHUCK**

Make it a **BURNERD** Xmas!

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Motors for your Workshop or Model

BROOK "BS.42" FRACTIONAL



A strongly built motor, small in dimensions
but giving useful power.

1/8 h.p. Single Phase, 1,440 r.p.m.

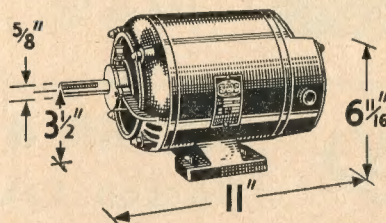
PRICE . . . £6 . 5 . 0

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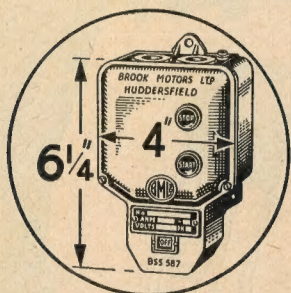
A firm favourite with the model
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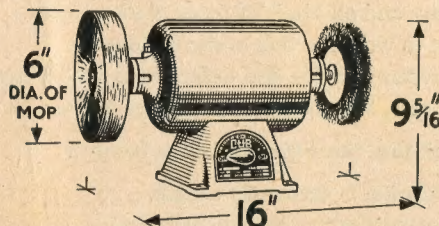
12 amps max.

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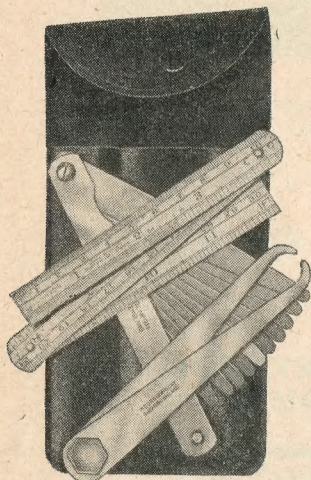
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From your tool factor or electrical contractor
BROOK MOTORS LIMITED
HUDDERSFIELD

I.NA.300

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ideal for the model maker and apprentice engineer

Set of tools for the apprentice, engineer, mechanic, handyman, etc. Comprising one No. 911 "Safe and Sure" Feeler Gauge with 10 tapered blades, 4 in. long, 1½, 2, 3, 4, 6, 8, 10, 12, 15, 25/1000ths. One No. 330/4 in. Inside Firm Joint Caliper; and one 12 in.-3-fold rule. These tools are chosen as being in frequent demand by the apprentice, but they will also be found an excellent set for the engineer and mechanic, and the handyman in his own workshop.

No. 373 Set
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The tools are supplied as a set in a neat black wallet, which is not only compact, but is strong enough to give adequate protection to the tools. It also has a press button closure.



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Why do they all find the Flamemaster so handy?

Because: Installation is extremely simple.

Flame control is easy and reliable.

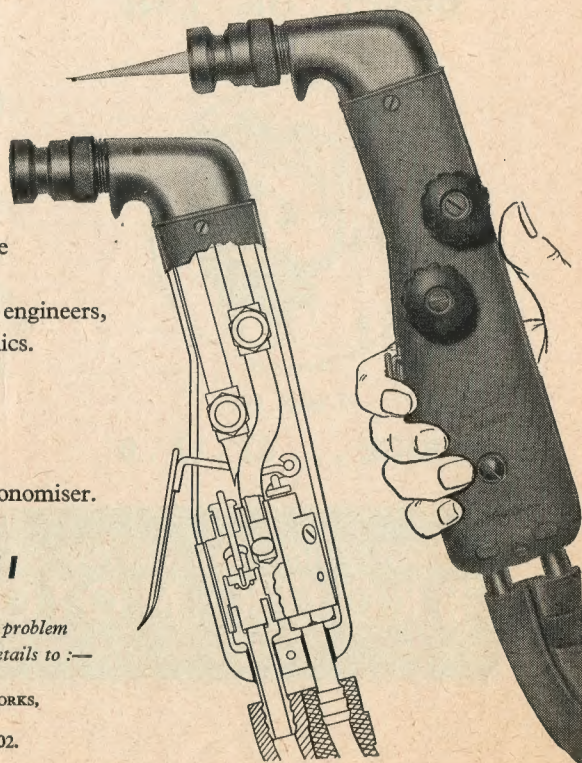
Waste is eliminated by our trigger grip economiser.

Leaks are impossible.

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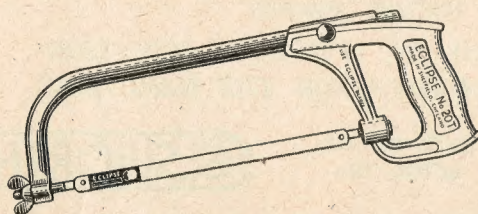


the name for good tools



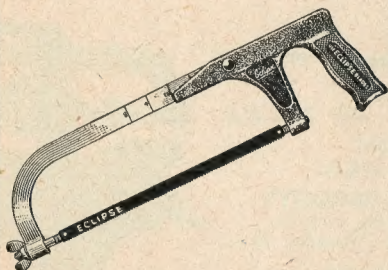
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With the ease with which a joiner's saw will cut plywood this unique 'Eclipse' saw will cut all types of sheet material, whether plain or corrugated and whether steel, brass, aluminium, asbestos, plastic or similar material.



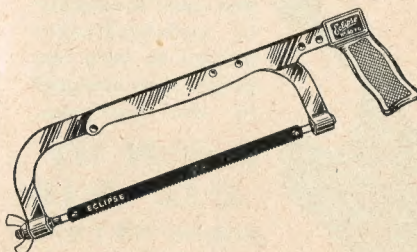
HACK SAW FRAME No. 20T

The new design of the handle, the adoption of a tubular bow of oval section, the fitting of a high-speed steel blade and the modern lines and graceful appearance enhance the features for which this frame is already famous all over the world.



HACK SAW FRAME No. 40 PG

A chromium plated adjustable frame of the highest quality with a die-cast handle.



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A plated adjustable frame for general purpose use with a tough plastic handle.

Made by James Neill & Co. (Sheffield) Ltd., and obtainable from all tool distributors

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The Five-in-One Machine

**SAWBENCH : PLANER : JIGSAW
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SIMPLY SCREW TO BENCH, PLUG IN,
ROTATE REQUIRED TOOL TO TOP AND
SWITCH ON!

COMPLETE MACHINE WITH ALL
ACCESSORIES, MOTOR, SWITCH AND
FLEX. FOR A.C. LIGHTING SUPPLY
200/250 VOLTS

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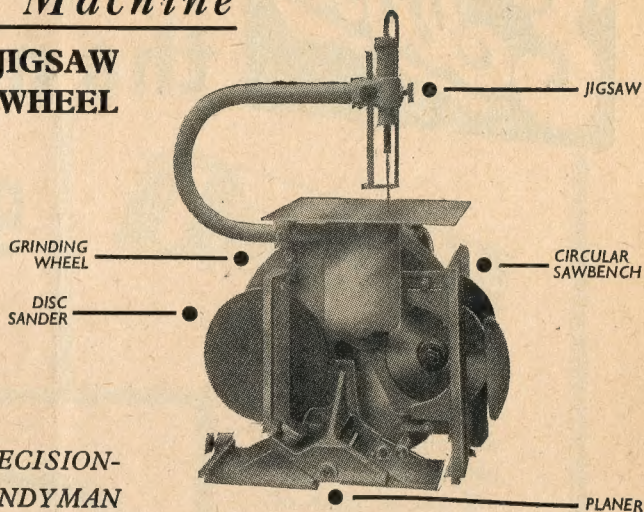
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**NOT A TOY BUT A ROBUST PRECISION-
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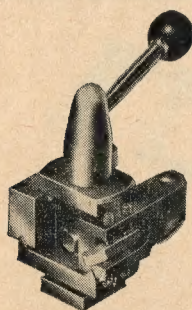
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THE BURNERD INTERCHANGEABLE



TOOL POST ensures
that each toolholder
is automatically
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Model TPI TP2
£7.5.0 £9.6.0
supplied with 7 tool-
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TPI is suitable for 3½ in. lathes, Myford
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TP2 is suitable for 4½ in.—5 in. lathes,
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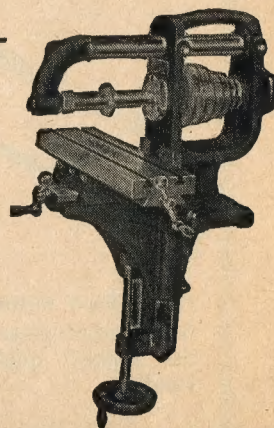
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Precision Ground
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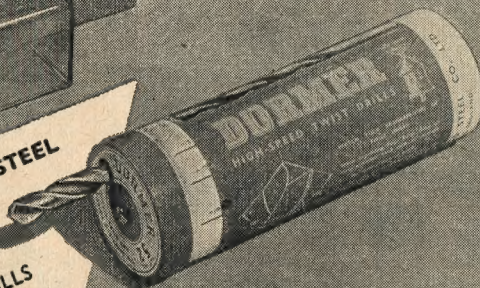
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WOODWORKING DRILLS
WITH 1/4" DIA. SHANKS
SIZES: 1/4" to 1/2" by 16ths.



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SIZES: 1/16" to 3/16" by 64ths.
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Nº53 CARBON STEEL
STRAIGHT SHANK DRILLS
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DORMER DRILL SETS ARE OBTAINABLE FROM YOUR USUAL ENGINEERS' MERCHANTS

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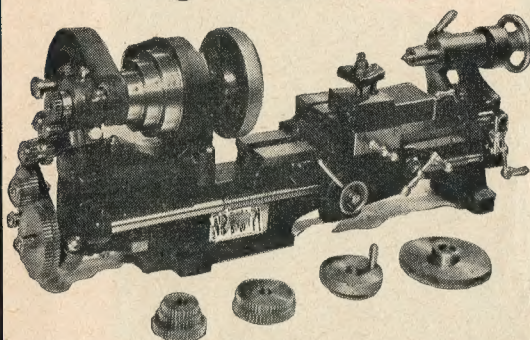
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prove it!



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Melts with a match. Needs no soldering iron, no flux, no special skill. On cards.

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Bib WIRE STRIPPER AND CUTTER

Strips insulation without nicking wires. Cuts wire cleanly. Splits plastic extruded twin flex. Adjustable to most wire thicknesses.

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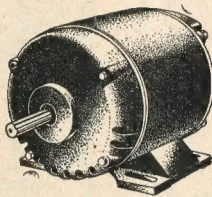
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Gives a heat around 2,000°

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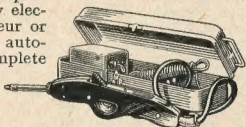
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'SOLO' ELECTRIC SOLDER TOOL

● Easy to use ● Instantly ready ● It never burns

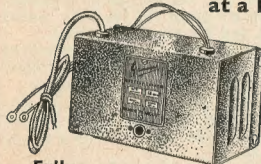
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Guaranteed BARGAIN
Post & Pkg. 2/- PRICE **55/-**

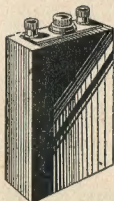
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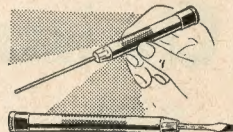
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Enables you to see in dark places SPOTLIGHT SCREW DRIVERS

fitted with small light with self-contained battery. Most useful for jobs in dark and awkward places. Overall length 8 in.

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with loose interior tray

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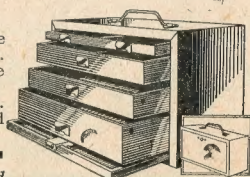
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BARGAIN PRICE **19/6**

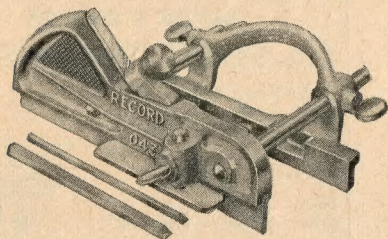
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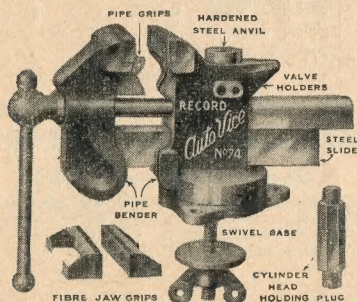
Carr. and Pkg. 4/6 England and Wales, 5/6 Scotland



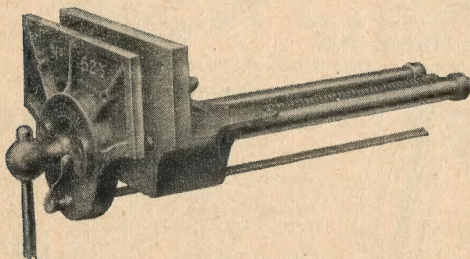
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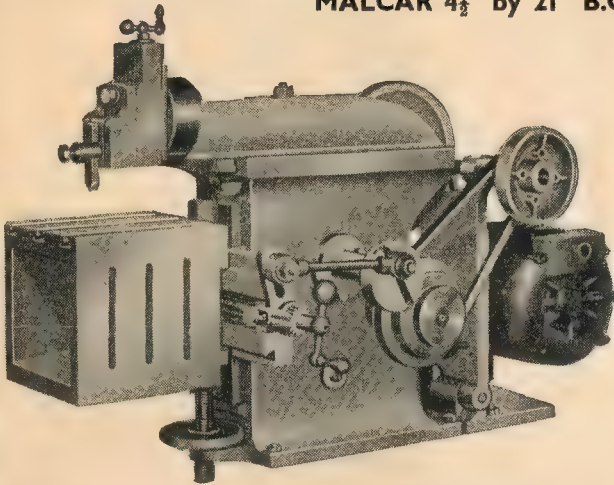
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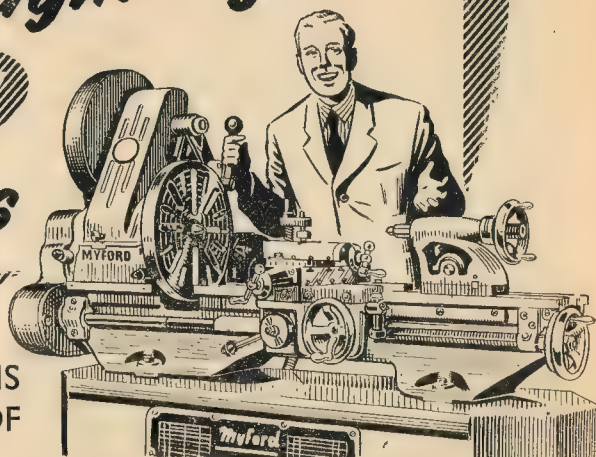
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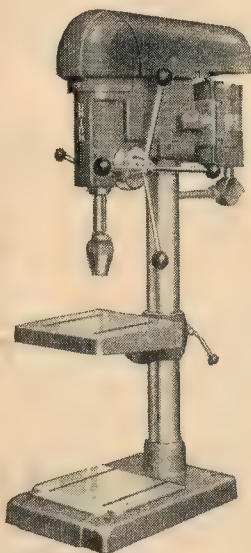
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THE MODEL ENGINEER

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Managing Editor E. F. H. COSH
Technical Editors
J. N. MASKELYNE, A.I.Loco.E.
E. T. WESTBURY
E. BOWNESS, A.I.N.A.
Features Editor
J. DEWAR McLINTOCK
Advertisement Manager T. C. PAGE

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OUR COVER PICTURE

A seasonable picture in full colour is reproduced this week; the original is a nice effort in water colour by Mr. Terry Aspin, whose light-hearted drawings and cartoons are familiar to most of our readers. This time, however, Mr. Aspin is in a slightly different mood, though far from the seriousness in which his theme might have been treated by other artists. Practically every detail has its significance as well as its humour, and we believe that the longer the picture is studied the more it will be enjoyed. It is thoroughly Christmasy without any reliance upon the usual, but hackneyed, "snow" motif.

Calling Edgware

MR. F. A. ROLLASON, 15, Gervase Road, Burnt Oak, Edgware, is one of a number of enthusiasts who regularly sail their power boats on the Whitestone Pond, Hampstead Heath, and who wonder whether they could obtain sufficient support to enable them to form a club. If any other readers are interested in this idea, they are requested to write to Mr. Rollason at the address given above.

Our Engine

UNDER THE above heading, there appeared in a recent issue of *The Bulletin of the Sydney Society of Model Engineers*, a little doggerel verse which will probably please any owner of a live-steam locomotive. To avoid the possibility of giving offence, we have altered one letter and one word in our quotation of it, with all due respect and acknowledgments to our Australian friends; it goes like this:—

Our Engine's built in Glasgow,
By a very canny Scot.
He marked it twenty horsepower,
'Cause he don't know what it's got.
But with William Blanky firing,
With the sun-dried gidgee logs,
She's worth thirty noble horses
And a score or more of dogs.

The Expert was Wrong!

ONE OF our readers who built a small boiler to a design published in *THE MODEL ENGINEER* submitted it during the course of its construction to an "admitted expert" on boilers and was informed that it would not stand up to the pressure for which it was designed, without some internal staying or other modification. He, therefore, decided, when the main work of construction was completed, to give it a "moderate" hydraulic test, up to 100 lb. per sq. in., before proceeding with the fittings and other finishing touches. A suitable pressure gauge and hand pump were connected up, but to his surprise, vigorous pumping produced no visible result on the gauge, though no leakage or deflection of the boiler was perceptible. Eventually the pump became hard to work, and the conclusion was reached that something

must be wrong with the pressure gauge, so it was removed for a comparison test with a standard gauge. It was then discovered that the screwed fitting on the boiler was completely blocked, possibly due to silver-solder getting into it during the brazing process. In these circumstances, it is fairly evident that the pressure which had been applied in the test must have been considerably higher than that intended; subsequent tests confirmed this, and the boiler "did not turn a hair." We are no less pleased than our correspondent that the particular boiler design has shown such a high margin of safety, and this experience provides yet another object lesson on the value of proper hydraulic tests in ensuring complete safety of boilers of any size.

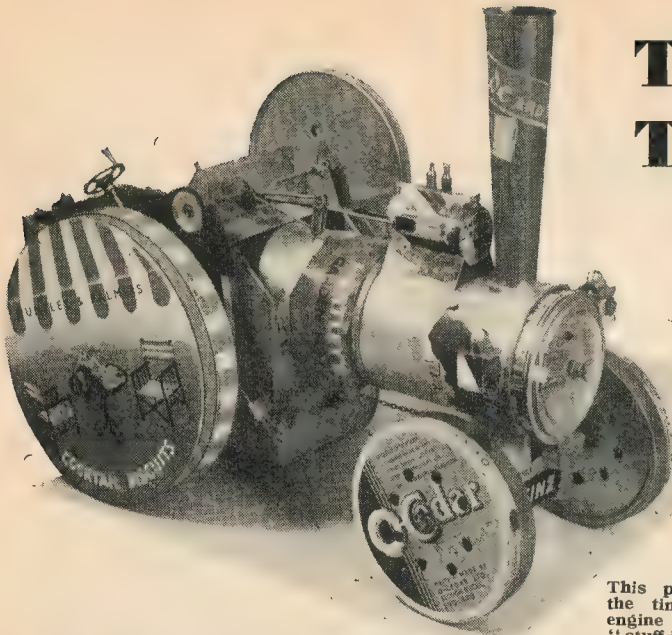
Col. L. B. Billinton

WE MUCH regret to record the death, on November 19th, of Col. Lawson B. Billinton, the last Chief Mechanical Engineer of the former London Brighton and South Coast Railway. As a locomotive engineer, he was a thoroughly sound designer who combined a faultless mechanical knowledge with a keen eye for neat and well-proportioned appearance, and his chief claim to fame was through his remarkable 4-6-4 type express passenger tank locomotives of the "Remembrance" class, generally conceded to be the finest-looking engines of their type ever designed.

Col. Billinton was also an enthusiastic model engineer who possessed a well-equipped workshop at his home; but he favoured, perhaps quite naturally, the large-scale model as exemplified in the 2-in. scale L.B.S.C.R. 2-6-0 locomotive he exhibited at the "M.E." Exhibition in 1950. Although he was, by profession, a locomotive engineer of the highest rank, he enjoyed and appreciated the locomotive enthusiast's love for the railway engine. He was a member of the Institution of Mechanical Engineers and, for many years, a Vice-President of the Stephenson Locomotive Society. As a man, he was good company with an inexhaustible fund of humour and anecdote and an infectious enjoyment of life. He will be sadly missed by all who knew him.

Tin-can Traction Engines

J. C. HOOL DESCRIBES THE MODELS WHICH
AMUSED THE CROWDS AT THIS YEAR'S
"M.E." EXHIBITION



This photograph of
the tin-can traction
engine shows the
"stuff it is made of"

APpreciating that many youngsters interested in model engineering may not possess the wherewithal to buy a lathe and other tools necessary to make what I might term a "real piece of engineering," my firm, Chloride Batteries Limited, featured at the 1954 "Model Engineer" Exhibition, traction engines made out of tin cans with the help of a few very simple tools. Since the exhibition, I have been asked to let various friends in the model engineer fraternity have details as to how these traction engines were made, and it would seem that this particular type of model would be very suitable for the average handyman to make as a gift for an appreciative youngster.

I myself am fortunate enough to possess a lathe in my workshop, but to make the engines that were shown at the exhibition, I confined myself to the simplest of tools that I think any handyman would find in his workshop. These were soldering iron and cored solder, a pair of scissors, rule, hand spike, a pair of pliers, and a small hand drill. The following list will give you an appreciation of the cost of materials required for the model.

Tin Cans—Biscuits, lighter fuel, syrup, disinfectant, Rozalex, etc. (with assistance from neighbours)	Nil
less contents	Nil
Fencing wire (nearest fence)	Conscience
Silver-steel axles and brass tube for bushes	1/-
Solder	3/-
Leather bootlace	4½d.
Motor (according to type)	
say	10/-
Two Meccano pulleys (boy next door)	?
Switch ?	1/-
Paint ?	2/-

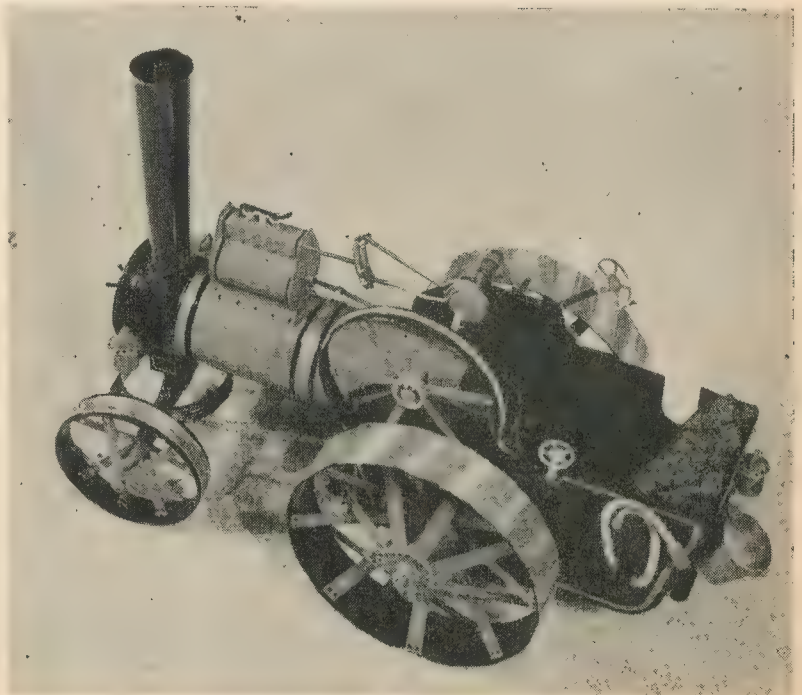
Coal (from cellar)	½d.
Chain for steering	1/-
Rubber bands (from office)	Nil

18/5

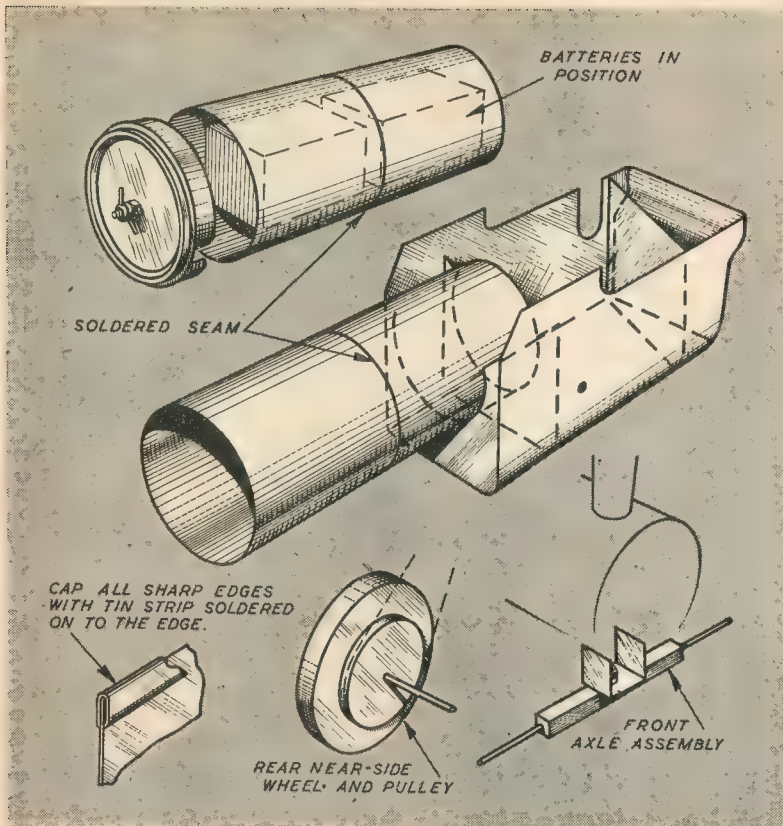
Motive power, 2 Drydex batteries L15
6 volt in series to give 12 volts, 3/6 each
.. 7/-.

At the exhibition two tin-can engines were shown, one being in a finished state, and the other as shown in the photograph reproduced, which will, I hope, give you a very good idea of the various components.

The boiler was made out of two vegetable or fruit tins, each approximately 5 in. long × 3 in. diameter, and these, soldered end to end formed the battery compartment housing; in the case of the model at the exhibition, two 6-volt L15 Drydex hand lamp batteries in series. These two batteries operated the engine for 15 hours continuous use, running at a good speed, using an ex Government 24-volt motor operating on 12 volts. The smokebox front was made from a syrup tin lid, but in the photograph, as you can see, this had not been pushed home properly before the photograph was taken. A strip of tin soldered round the edge of this lid ensures that it will stay in



The small battery-driven traction engine



Detail sketches, showing constructional tips for making the model

position when pushed into the boiler end.

Driving Compartment and Firebox

This section was made mainly from a disinfectant tin measuring roughly 10 in. \times 4 in. \times 6 in. The top and filler side of the tin were cut away to give the side elevation of the driving compartment and firebox. One end of the container was partly cut away in a semi-circle to make the seating for the boiler, and another additional section with a semi-circle cut away was soldered in the tin; this provided the seating for the driving compartment end of the boiler.

Holes for the rear axle were spiked and bushed on both sides of the firebox. The end of the driving compartment end was bent to shape and sweated on.

The rear wheels were made from two biscuit tins approximately 7½ in. diameter these being cut down in depth to approximately 2 in. before the lids were soldered on the tins. The nearside wheel is free to revolve on the axle, but the offside wheel is sweated on to the axle, having in addition on its inner side a smaller tin lid, which acts as a pulley for the bootlace driving band. The front wheels were made of polish tins approximately 4 in. diameter, and were mounted on an axle which swivelled

on a bracket under the front end of the boiler.

The funnel was made of sheet tin rolled round a broomstick, and, after rolling, was shaped by hand to give it the familiar taper. The cylinder casing was bent to shape from an oblong piece of tin, and the end plates were cut out and then soldered on. The safety-valve was made out of two plungers from an old electric lamp socket. The flywheel was made of two tin lids approximately 5 in. in diameter soldered together, and the crankshaft and the eccentric motion were formed from ⅛ in. galvanised fencing wire. This dummy motion does give the model a most realistic appearance, and the fact of it having a few parts moving around certainly creates an added interest for both young and old.

The electric motor was placed in the bottom of the driving compartment, with the shaft protruding through the side just under the flywheel. The flywheel was driven from the motor by a rubber band and the crankshaft transmits this movement to the off-side, where a small pulley drives the off-side road wheel by means of a leather bootlace. Although perhaps it may not be considered necessary to fit steering gear as in the full size traction engine, by means of worm and spur gear, this item of added

attraction is quite easy to fit. A cog-wheel can be found in the junk-box; a worm to fit the cog can quite easily be made by wrapping wire round the shaft and then drawing out the wire to mesh with the cog-wheel, before finally soldering the worm to the shaft.

From the odd assortment of tin cans provided by the housewife, such fittings as lamps, towing brackets, etc., can easily be made, and if you find it necessary to stiffen up the shape of the driving compartment, it is only necessary to solder an odd length of tin bent to a right-angle in the strategic points.

For models of this kind, I do not myself work to any pre-determined plans, but perhaps this article will be helpful, and enable you to provide some youngster with a gift worthy of the occasion.

Some of you may perhaps remember the very small traction engine (7 in. in length overall) which many youngsters enjoyed handling at the "M.E." Exhibition. I am including the photograph of this small model, as it may also prove to be of interest. Here again, three tin cans provide you with practically all materials.

This engine was driven by one of the miniature motors readily available on the market, and powered by two 2T5 Drydex batteries in parallel, to give 3 volts. Two such batteries drove this particular model for 2½ hours continuous running, and all models ran continuously for the whole ten days of the exhibition without giving any form of trouble.

Incidentally, I can assure you that a word to one or two of the neighbours will bring you an absolute flood of tin cans in a clean state, and, once you start, there is no knowing where this tin-can business will end!

Next Week . . .

HISTORIC MODELS

"Hallam" describes a number of models of such interesting old-time prototypes as tilt-hammers, rolling mills, an 1851 beam engine and a melting shop.

"BIG LION"

A splendid example of the Fowler "Big Lion" road locomotive to 2½-in. scale under construction.

"NETTA"

Reversing levers for different sizes of Netta are described and illustrated.

MODEL MOTORCYCLES

An illustrated review of the entries in the A.C.U. model competition.

THE "VULCAN" BEAM ENGINE

The machining operations on the cylinder and steam chest components are described in this instalment of the series.

Christmas Shopping

HINTS ON THE SELECTION OF SEASONABLE GIFTS FOR MODEL ENGINEERS

MANY of our readers, and even more friends of our readers, seek our advice at this season of the year, on the ever-vexed question of Christmas presents. The problem nowadays is not how to make the best of a narrow choice of available gifts; on the other hand, there is now almost an "embarrassment of riches" in the very wide variety of goods which the model supply trade has to offer, and there is no lack of items which can be assured to make highly acceptable gifts, to suit either deep or shallow pockets.

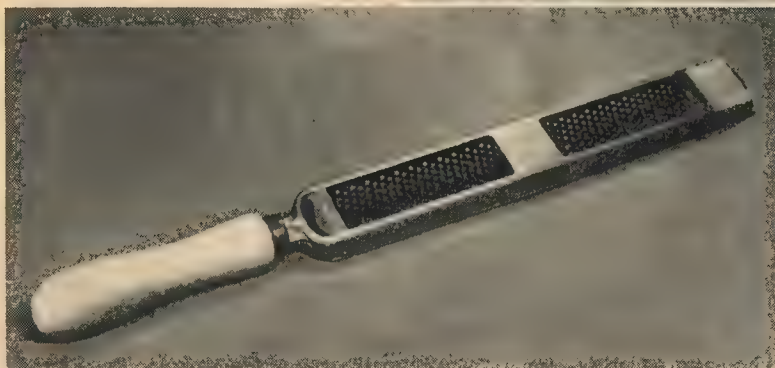
It is, of course, necessary to take into



Above: The Wolf power tool and circular saw attachment



Left: Moore & Wright pocket scribers



Above: The Surform tool ("file" type)



Left: The Eclipse hacksaw and the Record auto-vise

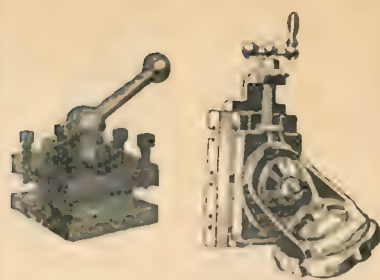
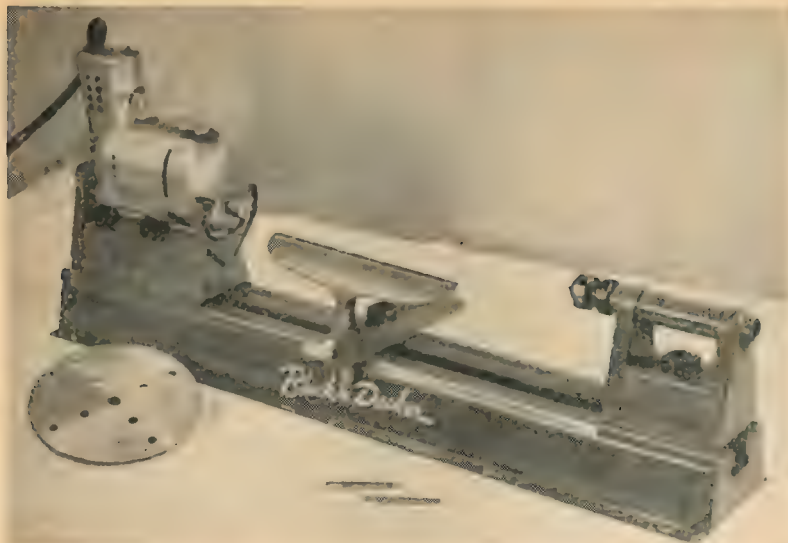
account not only the tastes and preferences of the prospective recipient, but also his facilities. For instance, a ship model specialist might have little use for a set of feeler gauges, while the die-hard steam enthusiast would find little to thrill in the gift of an ignition coil. Again, it is usually desirable to avoid the obvious, which so easily becomes the superfluous, like the traditional toast-rack as a wedding present. Generally speaking, the safest approach to the heart of a true model engineer is by way of tools to suit his line of activity, rather than parts or accessories for model construction, though the latter are highly satisfactory if they fulfil his known wishes in the matter.

Hand tools of every description offer a very wide selection of suitable gifts, and our advertisers illustrate many interesting items which are sure to please.

The "Eclipse" range of small tools includes such useful items as an automatic centre-punch, which would be a treasure to any metal worker; a wide range of hacksaws and coping saws, or a pair of matched vee-blocks. There is also the wide variety of measuring instruments by Moore & Wright, which range from inexpensive calipers, scribers, radius and feeler gauges to more expensive micrometers, slide gauges and protractors.

No model engineer would fail to appreciate the gift of an "Abrafile" saw frame with a set of blades, or a Tyler spiral saw outfit. The "Surform" tool, either of the "plane" or "file" type, has a wide range of application on either wood or metal, and is an efficient substitute for more expensive specialised tools. For the worker in wood on a small scale, such as model aircraft, ship models, marquetry, etc., the "Multicraft" tools are invaluable, and can now be obtained in handy kits which can be tidily and compactly stored. The Stanley range of tools for wood-workers includes not only their better-known items for carpentry and cabinet makers, but also more specialised tools for lighter crafts.

Model engineers whose work involves soldering or light brazing would appreciate an appliance such as the "Bullfinch" self-blowing gas torch or one of the smaller devices of this nature such as the "Spitfire" or "Davi-jet." Where no gas is available the "Britinol" or "Valtock" self-blowing spirit lamps will perform similar services. Electrically-heated soldering bits, such as the "Solon," are equally useful where



Myford four-tool turret and swivelling vertical-slide

Left: The Black & Decker "Craftsman" lathe, powered by the "Handy" utility electric tool

Below: The Bullfinch self-blowing gas torch

current is available, and the new "Scope" low-tension bit, which heats up in six seconds, is a great time-saver in the workshop, besides being capable of working from a car battery.

A recent innovation, the usefulness of which is out of all proportion to its cost, is the "Sprayt" outfit for spray painting, which enables the difficult problem of finishing the most elaborate models without obscuring detail to be effectively dealt with.

Where financial circumstances will allow, an excellent range of suitable gifts can be found in the various electric power tools by Messrs. Black & Decker, Bridges and Wolf, which, together with the wide range of attachments and accessories available to fit them, are capable of being adapted to innumerable workshop operations. The number of these accessories is constantly being added to, and now includes drilling stands, lathes, fretsaw and circular saw attachments, abrasive disc and cylinder kits, polishers, etc. Separate power tools for sawing, sanding and polishing are also made by the above makers.

Other small machine tools, but without self-contained electric power drive, are available, some of which are adaptable to a wide variety of operations on woodwork or plastics. An example of an inexpensive device of this nature which can be built up in several different forms, is the "Picador" universal woodworking machine.

If one cannot afford to give lathes or other machine tools—few of us can, these days—there is much to be said for machine tool accessories, many of which have a wide versatility. The Myford machine vice, for instance, is useful not only to the possessor of a lathe, but also on a drilling machine or other machine tools—even on the bench as well. To the machinist who handles difficult set-ups in constructing models,



The "Scope" superspeed electric soldering iron

the gifts of a Keats vee angle-plate would be a boon and a blessing; another very useful device in the same class is the Myford vertical-slide, and ordinary angle-plates, dogs, clamps, etc., are not to be despised by any lathe user. Sets of lathe tools in carbon or high-speed steel, or carbide tipped, are specially acceptable, and among these, the Myford patent height-adjusting tools deserve mention.

Other additions to lathe equipment

which any model engineer would value include Burnerd 3-jaw and 4-jaw chucks, available to suit all sizes of lathes, Reliance drill chucks, and to those not already equipped with power drive, Brook or Hoover electric motors. Sets of drills, such as those advertised by the Sheffield Twist Drill Co., or the drills for specially hard materials by Mason Master, have a universal appeal, and the same applies to sets of taps and dies for Whitworth, B.S.F., B.A. and M.E.



One of the most popular P.M. handbooks

Above, right: The Burnerd "Grip-tru" chuck



standard threads, as supplied by the British Tap & Die Co. Grinding appliances in wide variety, with or without powered drive, appeal to all users of cutting tools; and a very useful accessory to a tool grinder is the Reliance twist drill grinding jig. For every kind of bench work, the wide range of Record vices offers possibilities.

Other items which deserve mention in this review are the sets of castings and parts for the construction not only of models, but also workshop equipment, domestic appliances, cycle motors, etc., which have been described in *The Model Engineer* and are marketed by several firms, including Kennion Bros., A. J. Reeves, E. W. Cowell, W. H. Haselgrove, and Braid Bros.

Last, but not least, how about technical books as presents? The range of P.M. publications covers not only practical model making, but also most subjects in the field of workshop practice. To the locomotive enthusiasts, the "Live Steam Book" is a treasure; traction engines, ship models, power boats and i.c. engines are equally well catered for. The "Duplex" books form a sound guide to practical technique in the small workshop, and lathe operation is covered by several books on wood and metal turning, including the encyclopaedic "M.E. Lathe Manual." All the P.M. books are inexpensive, but contain a wealth of information.



A set of Dormer fractional-size drills, in handy container (Sheffield Twist Drill Co.)



The Brook Cub electric tool grinder

For those who wish to do their shopping locally, or to have immediate access to every item in this wide assortment of tools, we may mention that many of our advertisers are veritable universal providers, and can be relied upon to give excellent value for money in anything the model engineer may require. These include the well-known firms of Buck & Ryan, Tyzack, Garner, and A. J. Reeves, besides many others in various parts of the country.

These hints cover but a small selection

of the wide variety of good things available; to the regular reader, it may be that we have only shown them what is already obvious from a perusal of our advertisement pages. It may also be said that this review is for the information, not of the "M.E." reader, but his friends; as to that, we think the best advice we can give is to fold the "M.E." at this page, and leave it lying about (with appropriate items underlined) for the benefit of "whomsoever it may concern!"

Magic for Christmas

By "Magician"

WITH the approach of Christmas, it may be timely if I "give away" one or two "secrets" of magic; in other words explain in detail how to make a useful number of conjuring tricks.

Those I shall deal with can be made with the aid of a few modest tools from workshop scrap and whilst their finish will depend on the individual, they will all function quite as well as if professionally made.

My first trick we will call "The Magic Clock." The effect is that the performer spins a hand on a clock face and the hand will stop at any time called for by a member of the audience. The first requirement is a piece of plate glass about 8-in. square. If this is not available, then a piece of wood or metal can be used, but glass is best as, being transparent, it adds to the illusion.

In the centre of what will be the clock face, drill a hole to take a brass bush having a $\frac{3}{16}$ in. bore. This bush can be made to take a nut on the outside so that it can be held securely in position. In a metal clock face it could be soldered without the use of a nut. Next, drill two small holes at the top of the glass to take a silk cord.

Holes can easily be drilled in glass by using a tungsten-tipped drill, but it can also be done by using an ordinary drill lubricated with turpentine. The usual numerals must next be painted on.

Cut out a hand in any suitable piece of metal, the length being governed by the distance from the centre hole in the clock face to the numerals. Saw off a short length of brass rod of such a diameter that it will run easily in its bush and solder it to the centre of the hand. If you have a lathe, face-off the end which you secure to the hand, so as to ensure that the hand revolves without wobble. In the absence of a lathe, file the end as flat as possible.

Place the hand in the bush and revolve it. Remove metal from the heavy end and continue until you get the hand as nearly in perfect balance as possible. Next make a fitting as shown at A in Fig. 1. It consists of a short length of tubing, split on the top.

To the bottom, solder on a piece of metal as indicated. This fitting should be a nice push-fit on the spindle of the hand and this can be assured by squeezing up the gap in the saw cut. If you place this fitting on the spindle of the hand, put the hand in position on the clock face and give it a spin, the hand will stop with the weight at the bottom. This is obvious because you have previously balanced the hand.

To perform the trick, ask a member of the audience to call out a time at which the clock should stop. Assuming it is 12 o'clock, then you move the gadget so that the weight is at the bottom or 6 o'clock. The hand, when it stops, will point to 12.

If three o'clock is called for, you visualise the position of the hand when it is pointing to three and again put the weight to six o'clock. One or two trials will show you the idea.

Pass the hand round for inspection without the weight, which you keep in your left hand. When you receive the hand back, take it in your right hand and push on the weighted tube with your left.

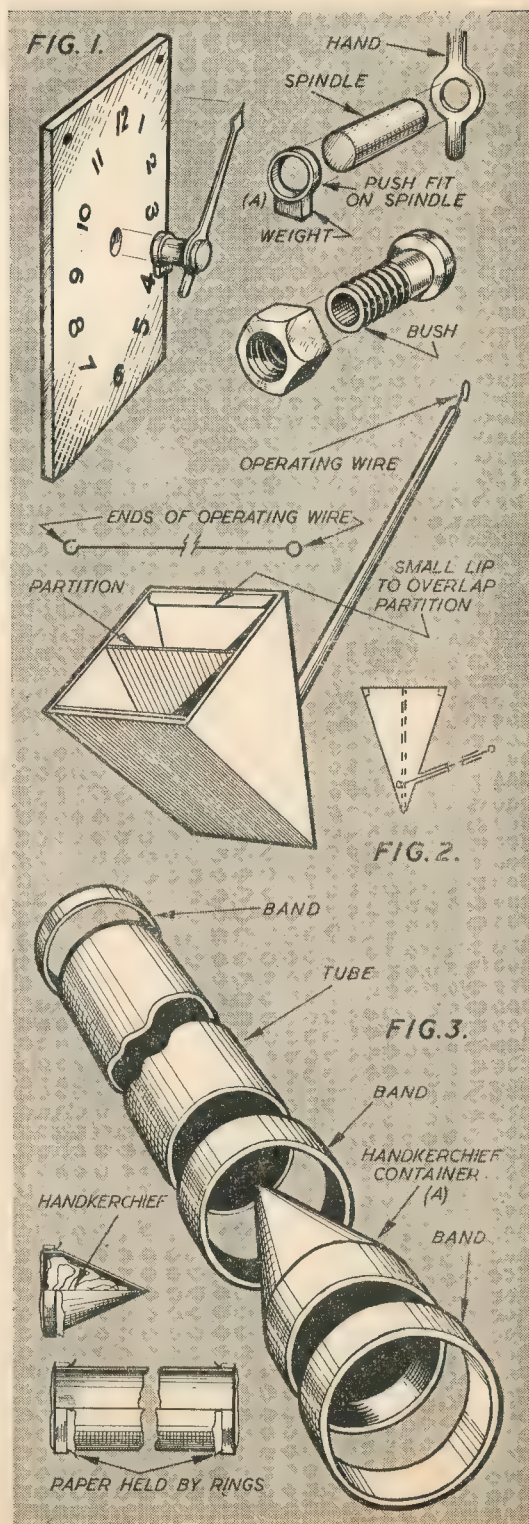
All subsequent movements are carried out by holding the hand at the centre by encircling it with the fingers of the right hand. It will be found quite easy to move the gadget with the tips of the fingers without anyone being aware of your action.

Using plate glass with numerals in red and using a red silk cord to suspend the clock, and, perhaps, a plated hand, the whole thing can be made to look quite professional.

A neat method of changing one card for another is by using a special ladle. This ladle has a central partition which can be moved, from one side to the other, by a wire running through the handle. The idea is shown in Fig. 2.

Very little explanation is needed. As to size, this is governed by the dimensions of a playing card, the handle being about 12 in. long. One little feature worth noting is that a lip should be formed on each top edge of the long sides of the ladle so that the partition cannot be seen even on close inspection.

(Continued on page 680)



An Electronic Organ in Four Nights

By Michael Oxley

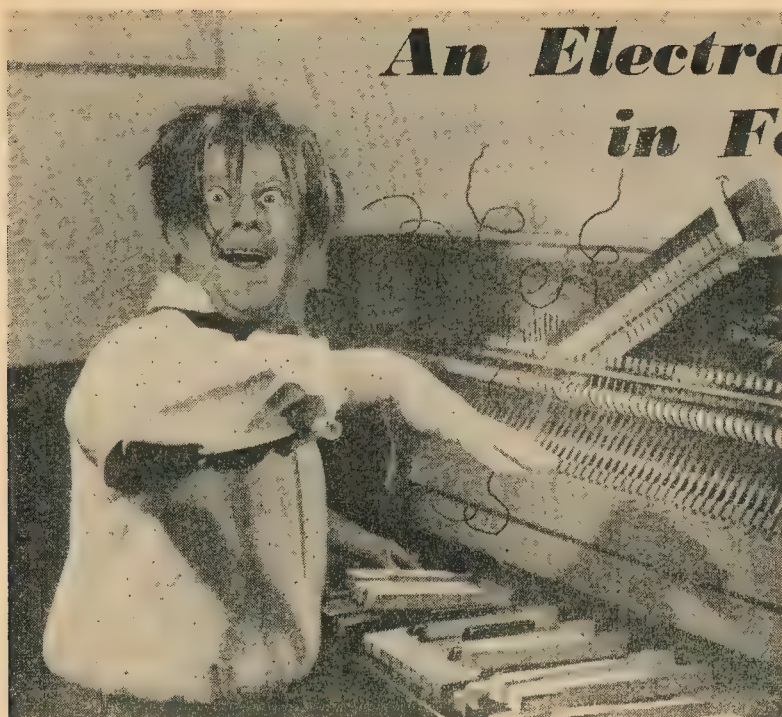


Fig. 1. They laughed when I sat down at the piano

plate, and the whole thing embedded in 6 ft. of concrete. Thanks to these precautions the camera was undamaged, and the complete lack of detail in the picture is probably due to one thing only. No little hole.

Before I could resume operations I had to rebuild my workshop and a few words about how I tackled this job may be of general interest.

First, I had to decide on the layout of the workshop, and here I believe it to be essential to spend as much time and ingenuity as possible to achieve the best result. I made fully detailed full-size working models of all my new machine tools out of balsa wood so that I could try them in every conceivable position. Actually I found that these models were considerably more efficient than the actual machines, and all my recent work has been done with them. When the best arrangement had been found I nailed them down and gave them four coats of blue paint. I believe they may have slipped a little, because it now appears that one can only use the drilling machine with one leg put through the middle of the lathe bed which gets uncomfortable after a time, especially in cold weather, and the miller must be operated while standing outside and leaning in through the window. But after all, even the best scheme must be something of a compromise.

Having got the workshop efficiently organised I began to cast around for something to make. There have been many requests in *THE MODEL ENGINEER* during recent months for an authoritative article on the electronic organ, and as my aunt happens to be hon. treasurer of the Dr. Thalben-Ball fan club I

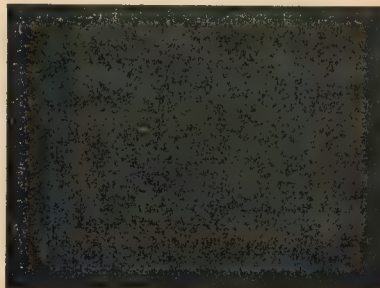


Fig. 2

I FEEL I must begin by apologising to all my readers, in fact to everybody who had their holiday spoiled by the terrible weather of this last summer. It was, I am sorry to say, all my fault. Some of you may recall that at this time last year I was in the act of describing my experiments with the World's First Atomic Bicycle, when a small mishap occurred which not only made it the World's Last Atomic Bicycle, but also gave rise to some of the worst weather we have had for 50 years. It all began with a trifling miscalculation on my part. I was in the middle of squaring the square root of minus one when I was called away to perform some small domestic task—my aunt had blown a fuse I believe—and I forgot to put in the little two at the top. This resulted in a gap of about four inches appearing between the tappets and the splunge-pin which allowed a stream of Ughium particles to escape into the atmosphere. Some of them were deflected by the pedals and impinged on a small bottle of mustard pickle which had accidentally got wedged in the spokes, thus setting up a chain reaction—a bicycle chain reaction in fact. This immediately raised the temperature of my workshop to some 4,000,000 degrees centigrade, with the rather unfortunate results mentioned before. My unique collection of machine tools, my lathe by Holtspiffle, my miller by Jolly, my drilling machine by Pressard Bustit and Blast, all were instantly vaporised and blown into the air in a huge, heavy grey cloud, which

has surged relentlessly to and fro over the British Isles ever since exuding water at frequent intervals. You may have noticed it.

I, too, would have shared a similar fate had I been anywhere near at the time, but I prudently took the precaution of being some considerable distance away. A large number of readers—four to be exact—wrote to *THE MODEL ENGINEER* asking for news of my whereabouts, if any, and I am deeply grateful to "G.D." of Carshalton, Mr. C. H. Clarke of Snaresbrook, Mr. Martin Rubeck Ltd. of Redhill, and Mother of Six, Tooting. I would also like to thank the gentleman signing himself "Wellwisher" who sent me a small, heavy oval object something like a baby pineapple in shape, but made of cast-iron with a pin projecting from the top. It is now standing in a place of honour on my mantelpiece alongside my compression ignition perpetual clock. Perhaps someday I shall find out what it is.

Some of you may be wondering how I ever found out exactly what happened if I was so far away. The answer is simple, the experiment was automatically photographed by a camera of my own design, and the very interesting picture obtained is reproduced herewith (Fig. 2). This camera, incorporating a 4.5 Bottulbotham Anastigmatic set in a shutter having eight speeds and reverse was mounted inside a massive lead casket to protect it from the deadly gammon rays. This was put inside a welded steel box made of 4 in. armour

thought it would be a good idea to build one, and describe my efforts for the instruction and enlightenment of you all. To prove that this is not such a formidable undertaking as might be supposed I decided to finish it in four nights.

In my usual thorough manner I began by delving into the past and finding out a little about the history of organ building. I am never too proud to profit by other people's mistakes and failures. It seems that the first organ was made by an obscure alchemist whose name, nationality and date of birth are unknown. There are no surviving descriptions or pictures of it, neither is there any reference to it anywhere, so that very little is known about it at all, in fact I can't think how I ever came to hear about it. All the early organs contained large numbers of pipes and were called pipe organs. It was this type of organ that Sullivan was seated one day at, weary and ill at ease. And no wonder, because the night before Gilbert, in a fit of ill-temper, had put a handful of wood-lice in his vox humana.

Many inventors attempted to produce an instrument that was not vulnerable to this sort of vicious attack, and the first successful example of a pipeless organ was made during the latter part of the eighteenth century by a French musician named Bert Higgins. King Louis XIX, having had the court organ-blower beheaded in a moment of absent-mindedness, offered a prize of 1,000 francs and a stuffed poodle for a new and novel musical instrument. Higgins' invention consisted of a long row of cages, each one containing a cat. The back of each cage had a small hole in the centre through which the animal's tail protruded. The tails were all connected to the keyboard of the instrument by lengths of stout cord in such a way that when a key was depressed the appropriate tail was given a smart tug, causing the cat concerned to emit a loud and melodious yowl. The cats were graduated in sizes, ranging from dear little tiny kittens for the top register to dirty great toms for the lower range. Each animal was carefully trained to give only the right note, in fact Higgins spent many weary months on this exacting task, armed with a tuning fork and lumps of succulent cat's-meat. At last all was ready and the court was summoned to hear the first recital by the Felinophone, as it was called. Hardly had the first noble chords been sounded, however, when there was a slight mishap. A couple of mice, startled by the strange noise, leapt down from a duchess's wig and trotted briskly past the row of cages causing complete discord for a couple of minutes. Order was at length restored and the concert proceeded to everybody's great satisfaction, with loud cries of "Il est tres smashing!" and "Vive Higgins!" Then suddenly, in the middle of the third extra an

unaccountable gap in the scale was noticed, and investigation behind the scenes revealed that D-flat was having kittens. A substitute was hastily procured and the demonstration ended in triumph, indeed Higgins' symphonic arrangement of Bless this House had to be repeated four times.

Spurred on by the success of his invention, Higgins began to make some improvements and modifications. First he halved maintenance costs by fitting the cages with a piped-milk supply system. Then he devised an arrangement of screws and levers so that by turning a small handle with one hand, the whole contraption would rise slowly up through a hole in the floor, while he played Happy Days are Here Again with the other. He decided to increase the range of the instrument and that was where he made his first great bloomer. He introduced dogs. The largest and most depraved cat he could find, could, with a reckless expenditure of fish, be persuaded to go down to middle "C" but no lower. Below that there was nothing. This made it very difficult to play anything by Bach or Tchaikovsky, and completely ruled out the works of Ellington and Basie. So in order to provide a good solid base, Higgins built a second row of cages underneath the first and filled these with carefully selected bull terriers and mastiffs connected in a similiar manner to a row of foot pedals.

Preparations were made for another grand demonstration, but behind the scenes all was not well. Intrigue reared its ugly head. A band of court minstrels, fearing that the new invention would imperil their livelihood, decided to sabotage it. The night before the concert was due to be given, they unscrewed the backs from all the cages and then

pressed all the keys at once.

The result was literally catastrophic; the frenzied animals tore about in all directions, each with a wrenched-off note attached to its tail by a piece of cord. The cords all got tangled up with each other and with everything else, the air was filled with barks and screams and flying fragments of bitten-off cat.

The palace was completely wrecked, and in the end, both the cavalry and the fire brigade had to be mobilised. Fourteen serving wenches were never seen again, and Louis XIX was found three weeks later firmly wedged up a bedroom chimney, to the annoyance of Louis XX. As for Higgins, he fled the country, together with the remains of his organ, and later set it up in a remote corner of Brixton.

He was now penniless; he had sent a request to Louis XIX for the 1,000 francs, but had received in reply only the stuffed poodle together with suggestions in French as to what he could do with it, and so he could not afford to restock the organ with cats. Instead, he used it to keep chickens in, fitting the milk intake with an automatic pellet-dropper, and providing inclined ramps for the eggs to roll down. He thus unknowingly introduced to the world the battery system of keeping hens.

Having learnt all I could from the history books, I turned my attention to the modern electronic instrument and found it to consist entirely of valves, usually arranged in banks of 400. They all have to be plugged in the right way round, and kept highly polished, which makes the thing very complicated, and it struck me that it would simplify matters enormously if it could all be done with one large valve. I found that I could not obtain a valve with 1,600 grids, not even on the Government

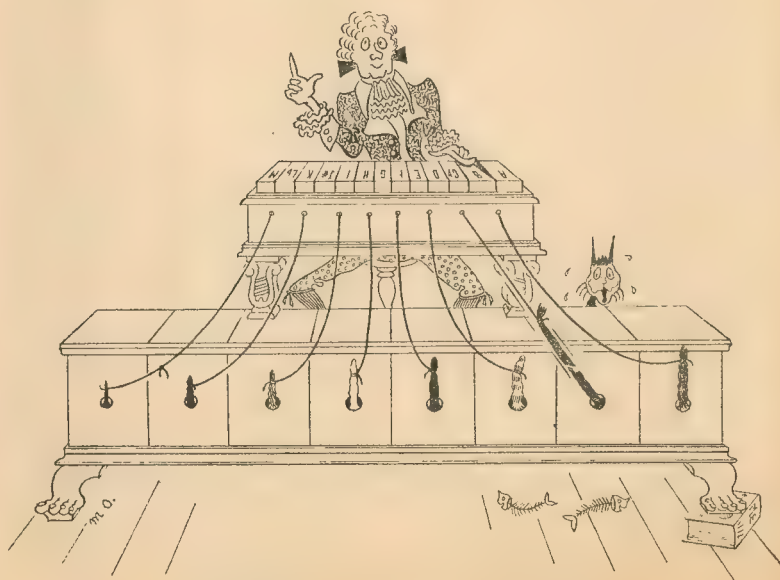


Fig. 3. Higgins at his Felinoophone (Mark I)

surplus market, so I set about making one.

First I ordered a large blown glass bulb from the Large Glass Bulb Blowing Co., and while I was waiting for this to arrive, I enlisted the help of a friend who is an expert at putting ships in bottles. He very kindly assembled the necessary grids and anodes in a recumbent position; they were afterwards inserted in the large glass bulb, and pulled upright by means of a winch.

My next task was to exhaust all the air, and this was rather a problem, as the only equipment available was my spare bicycle pump, and all my attempts to make it suck instead of blow proved fruitless. For a while I was nonplussed. Then I had a brainwave; why not get in the valve and pump the air out from inside? I flatter myself that not many people would have thought of that.

So, armed with bicycle pump, a spaceman's helmet, and several packets of sandwiches, I lowered myself gingerly into the valve and began pumping. It was quite easy at first, but when I got down to the last little bit of air I just couldn't seem to pin it down. It darted about here, there and everywhere like a globule of mercury, but at last I managed to put a foot on it, then a few quick strokes of the pump and "phoop"—it went out, leaving a perfect vacuum. I then climbed out very hurriedly, before it could turn round and get back in again.

As my original estimate of four nights had been exceeded somewhat—the valve alone had taken seven months—I thought I would try and save time on the rest of the instrument by using some ready-made parts. At about this time, a friend offered to sell me a second-hand ex-N.A.A.F.I. piano for a very modest sum, so I went round to try it out (Fig. 1).

They laughed when I sat down at the piano; mainly because, when I started to play, eighty-seven notes fell off, so the only decent thing to do then was to buy it. I pushed it home and began to dismantle it. On removing the front panels, I found that the whole of the bottom part was filled with a solid block of some brown gummy substance believed to be congealed beer; this was carefully prized out, and stored away for future investigation.

The top half was tightly packed with fine black fluff, no doubt to protect the action during storage, and the whole thing was in first class condition apart from the eighty-seven loose keys. These were tacked on, and the job of electronication commenced. First of all the lower ends of all the wires were disconnected, bent upwards and poked through holes bored in the lid. They were then spot-welded to the pins on the valve, thus forming a network of variable impedance, with or without negative feed-back. Vibrato was taken care of by having two electrodes embedded in one of my Aunt's jellies, which she flavoured with copper sulphate to render it conductive.

Well, that brings the story up to date. All that remains to be done before I give my first recital is to provide a suitable supply of h.t. current. An ordinary organ valve works on 275 volts so assuming that my valve is equal to about 1,000 of these, it follows that I shall have to apply a voltage of about 275,000 to obtain the best results. It so happens that one of the main grid supply lines runs almost over my workshop, and according to the large red notices which the Electricity Authority have kindly placed on the pylons, it supplies current at exactly this voltage. All I have to do is make a connection. I have obtained a length of heavy bare copper wire and soldered one end to the top of the valve, the other end terminates in a lead weight. Tomorrow, I intend to throw the weight up so that the copper wire wraps itself round the cable three or

four times, thus making a good electrical joint. This is purely a temporary measure, of course. . . .

(Editorial Note.—Once again Mr. Oxley's manuscript appears to be unfinished and as it was delivered in a rather unorthodox manner—it blew in through the office window, preceded by a sheet of blue flame—we sent a messenger to investigate. He found nothing but a huge crater, surrounded by smoking wreckage. We feared the worst, but a few days later we happened to be in the neighbourhood when we saw a strange procession coming down the road towards the scene of the disaster. In front was a lorry laden with bricks, followed by another filled with balsawood logs and drums of blue paint, so we assume that once again, Mr. Oxley has "received no personal damage!")

MAGIC FOR CHRISTMAS

(Continued from page 677)

This is not a piece of apparatus which is handed round. It is picked up by the conjuror more as an afterthought than anything else, because if any notice be brought to it, it is certain to be treated with suspicion.

Fig. 3 shows the component parts of the Handchief Tube. One effect is that you show the tube empty, make a "drum head" at each end, and immediately produce a handchief or a number of handchiefs from the tube.

The tube can be 6 in. long by 1 in. diameter with both ends square and smoothed-off with emery cloth. Next, make two bands, of such diameter that they will pass over the tube with ample clearance. Then make a container of the shape shown at A Fig. 3. Length should be about 2 in., but do not have this too long as you have to conceal it. A container 2 in. long will hold quite a number of small silk handchiefs or flags.

The container can, of course, be used for any object of a size which it can accommodate. Make a band to fit the container as you did for the tube.

Before commencing the trick, place the handchiefs in the container and using the container-band and a piece of grease-proof or similar paper, make a drum head; keeping the container out of the way, you show the tube to be empty and as openly as possible you enclose both ends by a drum head using the same kind of paper you used for the container.

You then take the tube by one end in the right hand and rest the other end in the fingers of the left hand which is holding the container with the pointed end towards the fingers.

If you push the tube on to the point of the container, the drum head on the tube will be broken and replaced by the one on the container when the latter is pushed right home.

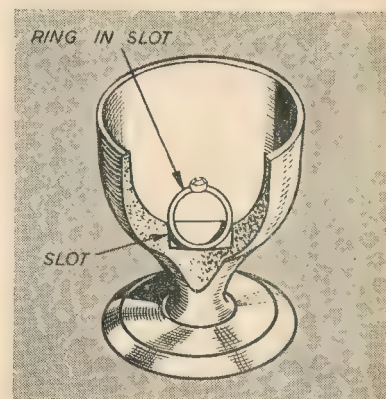


Fig. 4

You can still show the tube with both drum heads intact and yet, when you break open one end with a finger you can extract therefrom anything you may have placed in the container. This is an excellent trick and easy to perform. Be certain not to leave any burrs on the edges of the bands.

A trick that never fails to receive applause is the one in which a borrowed ring is discovered in an egg chosen by a member of the audience. In this case it is the egg-cup which holds the secret.

Again, little explanation is needed and Fig. 4 shows the idea. A wooden cup can be purchased or turned-up in the lathe.

At the bottom is a slot which will receive and hold a ring on its edge. When the egg is put into the cup, the shell is broken by the upstanding ring.

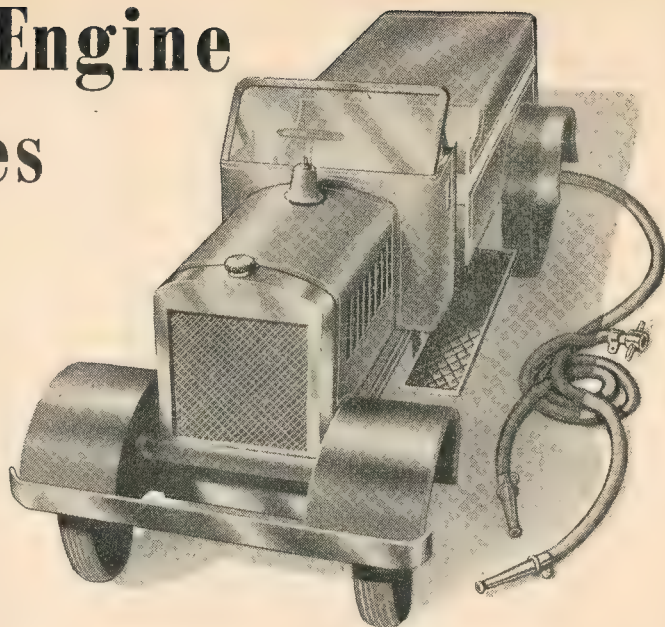
If a button hook be thrust into the top of the egg, very little fishing should be necessary to hook the ring which is then drawn up through the egg.

A Steam Fire Engine for the Kiddies

By "L.B.S.C."

JUST after reading our worthy managing editor's letter requesting something special for the Christmas number, I happened to see two small boys thoroughly enjoying themselves with a garden hose, and that put an idea into my noddle. I'm not writing any more tales, and reminiscences make me feel sad nowadays; so why not describe how to make a simple fire-engine, so that the kiddies could squirt away to their hearts' content? I always act on impulse, so got busy and made the necessary drawings; and the greatest wish of my heart at the present minute, is that the "mums" of those nippers who get one of the engines, won't come around looking for me with a tommy-gun! Well, I've only a few pages in which to describe it, so here we go.

Modern kids have never seen one of the old Shand-Mason or Merryweather engines of my childhood days, so one of that type wouldn't have found favour; and I have made *Nanny* "look like what she ain't," as she resembles an ordinary petrol-driven outfit of the type that they all know. She can run to the fire at a high speed, ringing her warning gong to clear the road, and when she gets there, her powerful pump with two hoses, will soon do the needful. There is nothing complicated about the working parts, and dad can easily build her from oddments, very few special parts being needed. The rubber-tired road wheels can be bought at most toyshops (a set off a discarded or worn-out carpet sweeper would be just the cat's whiskers) and Meccano



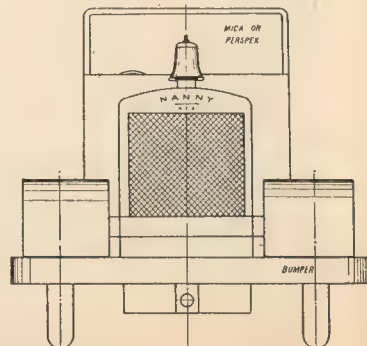
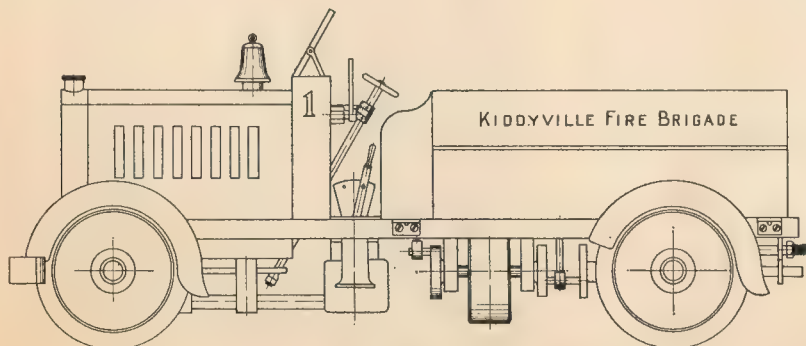
or similar wheels can be used for the gears. I won't have the space to describe the job in full detail, so I have made the drawings as simple as possible; and anybody who has built one of my locomotives, shouldn't need any description at all. Here is just a brief "run-through" of the job.

Frame and Boiler

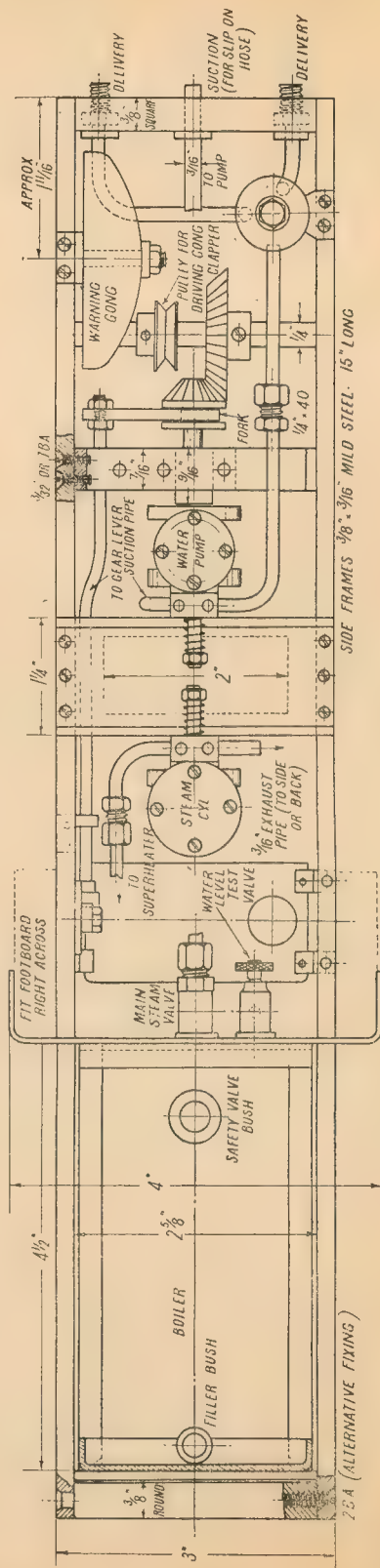
The frame is simply two 15 in. lengths of $\frac{3}{8}$ in. \times $\frac{3}{16}$ in. mild-steel rod, joined at the front end by a piece of $\frac{3}{8}$ in. round steel, and at the back by a piece of $\frac{3}{8}$ in. square steel. The springs are same as used on locomotive tenders, cast dummies, screwed to the underside of the bars; no objection, naturally, to anybody making working leaf springs if he so desires. The front axle is screwed direct to the front springs, and simple axleboxes are fixed to the back ones, to carry the live axle. Don't fit the axles until the "works" are erected.

The boiler is a simple "pot" type

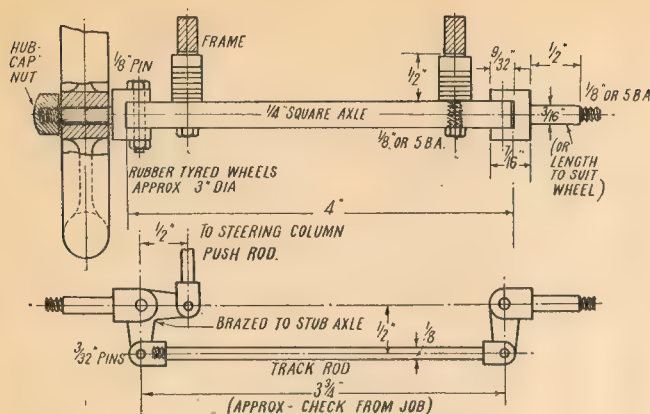
fired by a spirit lamp. The front end forms the backing of the "radiator," and the dashboard forms the backhead. The barrel is a piece of 2 in. seamless copper tube, brazed to the ends as shown, and has three water-tubes silver-soldered into the underside, to help make her a fast steamer. There is no chimney, the products of combustion escaping through a series of slots in the bonnet, which is a piece of thin sheet steel, bent to the shape of the front end, and fixed by a few screws through the flange. To support the bonnet at the back end, rivet a piece of angle-brass to the front of the dash. A bush is silver-soldered into the top, at the front end, for the filler screw which forms the "radiator cap," and another bush is provided close to the dash, for the safety-valve, which is of the kind I describe for locomotives. This is covered by the dummy bell, just above the valve seating, to let the steam out.



Side and front elevations of the kiddies steam fire engine



Sectional elevation and plan of "the works"



Front axle and steering details

The fittings comprise merely a screw-down valve of my "standard" type, with a long handle so that young Fireman Jack (or Firegirl Jill) will not burn their fingers; and a glandless screw-down valve fitted about two-thirds up, to test water level when filling. The 5/32-in. steam pipe goes from the union, through the lamp flames, thence to the engine, as shown.

Engine and Pump Unit

This unit is about the rock-bottom of simplicity, consisting of two oscillating cylinders placed back to back, with a single crankshaft and a heavy marine-type flywheel between them. The port-blocks are prolonged downwards, to carry the shaft, and they are supported by a channel-shaped frame, bent up from sheet steel (bench-vice job) to which they are screwed. Be careful to get both port-blocks dead in line; easy enough if you put a piece of rod through the shaft holes, and another through the trunnion holes. No reversing gear is needed, so the passages for steam and water are just plain drilling. The steam, exhaust, suction

and delivery pipes can be silver-soldered direct into the port blocks, or attached by unions, just as you fancy. A "tea-urn" lubricator, or rather oil-cup, is screwed into the steam port-block right above the passageway; steam must enter opposite this, otherwise only one end of the cylinder would get oil, and it will have a longer life if both ends get oily steam. The hole at the bottom of the "tea-urn" should be drilled as small as possible, say No. 75.

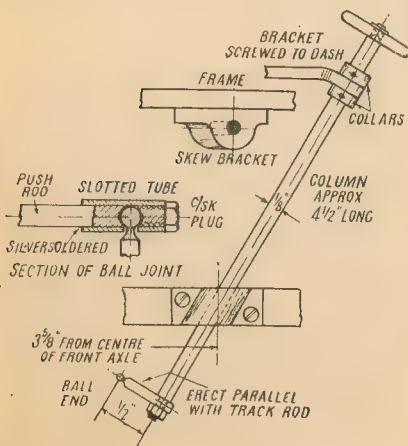
The disc-cranks should be a press-fit on the crankshaft, but the flywheel, which is fitted first, may be set-screwed. The crankpins are set dead opposite, the pump pin being longer than the steam one, as the disc driving the propeller shaft has to slide along it. The shaft should have just the weeniest bit of endplay.

Both steam and pump cylinders are similar, the only difference being that the steam one is $\frac{1}{2}$ in. bore, and the pump $\frac{3}{8}$ in. bore, the stroke being $\frac{3}{4}$ in. I couldn't help smiling when I drew out the pump cylinder, to think of the fuss sometimes made about double-acting pumps; yet here is a double-acting pump which will pump away like nobody's business, and the blessed thing hasn't even a valve! As the machining and fitting are exactly the

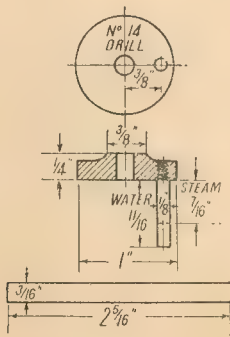
same as I have described several times already, there is no need to dilate on the job. Be careful to get true faces on both the cylinders and port blocks, by the process I recommend for valve facing. The complete unit is attached to the frame by screws at each side, in the position indicated in the assembly drawings. If the steam-pipe is coupled up to the boiler, the unit can be tried under steam right away. The pump, of course, operates when the fire-engine is travelling; but as the suction-pipe isn't in water, it just pumps lots of nothing, and the friction is negligible, as long as workmanship is up to average.

Driving Gear

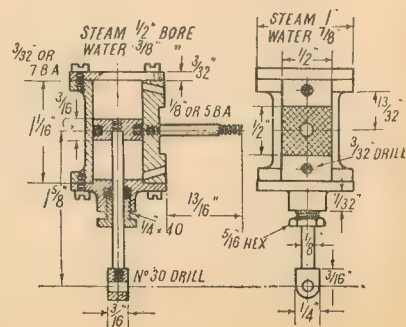
The drive is through a bevel gear-wheel on the live back axle, driven by a bevel pinion on a sliding propeller shaft, driven from the crankpin of the pump. An ordinary pinion, with a crown-wheel having its teeth at right-angles, as used in many clockwork toys, would also do quite well. The propeller shaft is carried in a bearing attached to a cross-stay, like that on a locomotive; the bearing is made long enough to render another bearing unnecessary, and carries a side extension through which the actuating-rod passes. The disc at the front end is slotted to



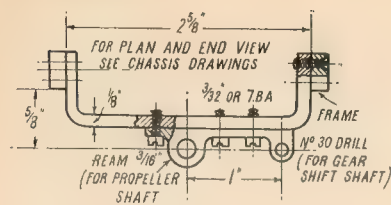
Steering column



Crank and shaft



Steam and pump cylinders



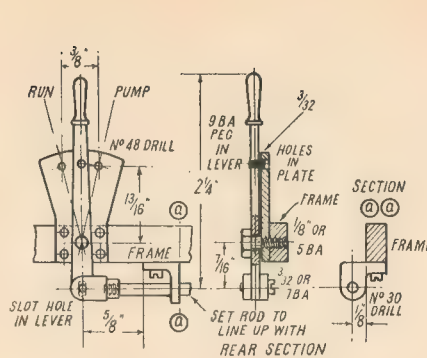
Propeller shaft bracket

engage the pump crankpin, and may be pressed, or screwed to the shaft. A grooved collar is attached to the shaft, close to the pinion, or the actual boss of the pinion may be grooved, if suitable. In this groove, are the prongs of a fork; the "handle end" of the fork is nutted to a sliding rod which extends to the front end, close to the driver's seat. This rod is bent to line up with a lever like the reverse lever of a locomotive, pivoted to the frame; a simple quadrant-plate is interposed between the lever and frame. The lever extends down below the fulcrum pin, and the gear-rod is attached to it by a fork, with a pin passing through a slotted hole in the lever. The gear rod is supported by an angle bracket just at the rear of the lever.

The bottom of the lever should have a bare $\frac{3}{16}$ in. of movement; and to hold it steady, a peg is fixed in it, as shown, engaging with little holes in the quadrant plate. The lever is sprung sideways, to disengage the peg from the holes; a very old wheeze, that, used on early motor cars. To ensure that the gears mesh properly, push the lever forward, so that the peg enters the front hole; then adjust the bevel wheel, or crown wheel, on the axle, until there is just the tiniest amount of slack between it and the pinion. When the lever is pulled back, and the peg enters the back hole, the gears should be right out of engagement, and the slotted driving disc just clear of the pump big-end.

Front Axle and Steering

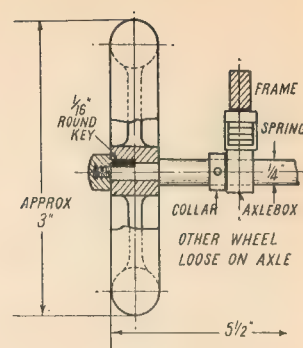
The front axle is a piece of $\frac{1}{4}$ in. square rod attached to the leading



Lever "run-or-pump"

springs as shown, and is finished with a simple swinging stub axle at each end, made just like a glorified valve-gear fork, and fitted in the same way. The exact shape and size of the wheel seat, depend on the kind of wheels used. If they have plain bushed centres, make them as shown, of a length to suit the wheel boss, and about $\frac{3}{8}$ in. diameter. The wheels should run easily, but without excessive endplay. Make the nut like a hub cap, and Inspector Meticulous will raise loud cheers. If the wheels have ball-bearing hubs, like those on our carpet-sweeper, the spindle should be turned to suit the bore of the bearing, and the nut clamps it tight.

The steering arrangement is simple. A bell-crank is brazed to the bottom of one stub axle, and a single crank to the other; these are cut from 13-gauge sheet metal. The track rod is just a length of round steel with a fork at each end, like a valve-gear rod. The steering-column is a $\frac{1}{8}$ -in. rod about $4\frac{1}{2}$ in. long, running through a bracket attached to the inside of the frame, the bracket being drilled at an angle, to give the necessary slope to the column. The top is furnished with a steering-wheel made like *Britannia's* reversing-wheel, minus the handle or grip, and attached in the same way. A small bracket cut from 16-gauge sheet, and bent as shown, supports the upper end of the column, and is attached to the dash by a screw. Put a little collar



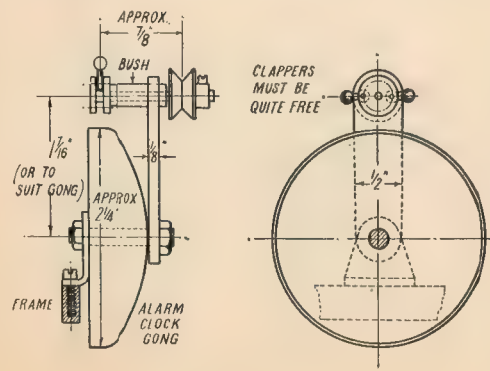
How to fit driving wheel

on the spindle, above and below the bracket, to prevent the column from up-and-down movement.

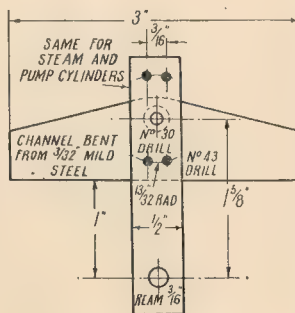
An arm, or single crank, is attached to the bottom of the column, and connected to the bell crank on the stub axle by a rod, similar to the track rod, and called a push rod. As the back end of this, moves in a different plane to the front end, an ordinary fork won't do for the joint, so we must use a ball-and-socket joint. Weeny ball-and-socket joints are used in automobile work, and it might be possible to buy one ready-made at a motor-accessory dealers' store; but one can easily be made specially for the job. Form the end of the arm into a ball; countersink the back end of the push rod, and bend a bit of 16-gauge metal around it, leaving the joint open, to form a slot for the "neck" of the ball. Silver-solder the slotted tube to the push rod, tap the end, and fit a plug with a countersink in it, filing the end until the ball is just free when the plug is tight home. The column should be slightly stiff to turn, so that it "stays put," when the engine is running to the fire (it is hardly big enough to carry Jack and Jill!) and this is easily wangled by setting the collars on the spindle, so that they bear on the upper bracket. Very little movement of the steering-wheel is required to turn the wheels to full lock.

Rear Axle

The rear axle is a length of $\frac{1}{4}$ in. round steel as shown, passing through the bearings, or axleboxes, attached to the underside of the back springs. A collar is pinned to the axle, outside each bearing, to prevent endplay. Note—as we are not fitting any differential gear, and as there is considerable friction set up when rubber-tyred wheels rigidly fixed to the axle, traverse curves, one wheel only is fixed to the axle, the other running free, same as the front wheels. This "single-wheeler" drive is quite satisfactory, and is used on the great majority of kiddies' tricycles. The axle carries, in addition to the crown wheel already mentioned, a small pulley for actuating the gong clappers. If the engine didn't have any warning gong, it wouldn't be of great interest



Warning gong



Combined port block and shaft bearing

to several young merchants of my acquaintance. The first question they ask about a small steam locomotive, isn't how fast it will go, or what load it will pull, but just "does it whistle?" Aren't kids funny? The speculation as to how my L.B. & S.C.R. signal was

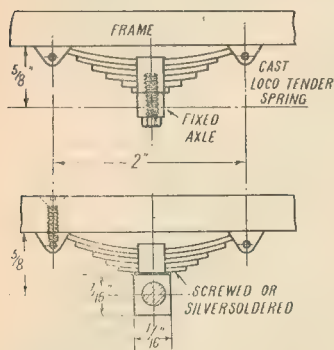
the rear axle, the clappers fly out by centrifugal force and beat a lively tattoo on the gong—"Look-out—here—we-come-mum!" says Nanny. If she kicks up too much of a shindy, just take the belt off.

Details

An air vessel, or balancing chamber, should be fitted, to ensure that both hoses get an equal share of the pump delivery, and squirt in a steady stream instead of in jerks. This is merely a $1\frac{1}{2}$ in. length of $\frac{3}{8}$ in. thin tube with silver-soldered end plates, a plug at one end, and a bracket for attachment to the frame near the back end. The branch pipes to the hose unions are silver-soldered into the bottom as shown, and another pipe with union, connects the air vessel to the delivery side of the pump. The two branch unions are just the same as the hand-pump union under the drag-beam of a locomotive, and are supported the same way, by passing through a plate bracket attached to the back of frame. The suction pipe is also attached like the suction pipe of a locomotive feed-pump, being supported by a hanging plate bracket, the pipe going from the "drag-beam" direct to the pump.

Ordinary rubber tube can be used for the suction hose and delivery hoses. The suction hose can merely be pushed over the end of the pipe leading to the pump; but if the delivery hoses are only push-fits, they will probably blow off when Nanny really starts squirting, so regulation-type branch unions should be provided. These are made like locomotive unions, but from round brass rod, and should have pegs attached to them, for hand operation, same as in

piece of mica or perspex sandwiched between them, like locomotive cab windows; warning—*don't* use celluloid! It is attached to the dash by two small clips, and two stays as shown. Other accessories can be added just as the builder fancies—or as the kiddies dictate! A coating of bright red paint,

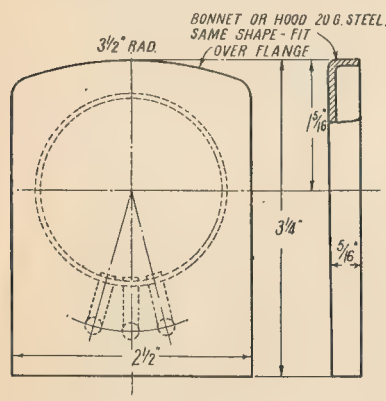


How to erect springs and axles

worked from the signalbox on the bank opposite, was as good as any pantomime.

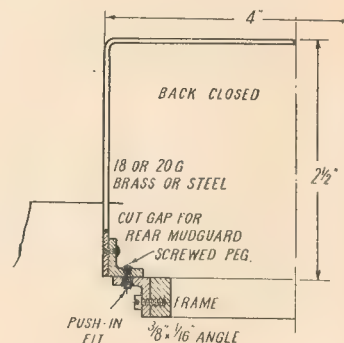
Warning Gong

The gong from a discarded alarm clock does fine for this job. It is attached to a bracket screwed to the frame at the rear end. On the outside of the dome, is a vertical support carrying a bush, in which runs a small spindle carrying a V-pulley at one end, and a pair of jointed clappers at the other. The latter are just the same as used on automatic fire-alarms. A pulley with a deep square-bottomed groove in it, is attached to the outer end of the



Boiler front

spindle. The clappers can be turned from a bit of rod, the opposite end to the ball being flattened, and pinned to the groove, so that it can swing freely. When lying flat against the pulley, they should clear the gong easily, but should hit it when at right-angles to the pulley. As the spindle revolves, driven by a belt of thin twine, from the pulley on

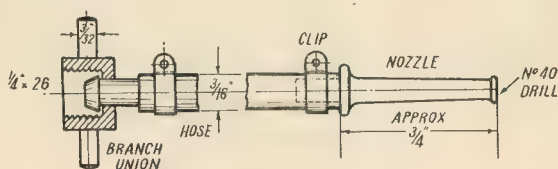


How to fit rear casing

and a spot or two of lettering and lining, and Nanny will really be "the pride of the K.F.B."

Operation

Oil all moving parts with thin machine oil, and fill the "tea-urn" with heavy black cylinder oil. The wick tubes should be loosely packed with asbestos string or flock, and the tank about $\frac{3}{4}$ -full of methylated spirit. For quick steam-raising (you want to get a move on when the station alarm goes!) fill the boiler with hot water until it runs from the water-level valve, then light



Hose coupling and nozzle

full size; the youthful fire brigadiers won't have any trouble in coupling up. The nozzles are turned from brass rod. The whole of the "works" can be covered by a sheetmetal hood or casing, made in one piece with the driver's seat, and attached by pegs fitting into angles screwed to the frame, so that the whole issue can be lifted off as one unit, without having to unscrew or disconnect anything. I have shown flat mudguards, which can be attached direct to the frame by screws, but if anybody likes to go to the trouble to make and fit posh domed wings, well, go right ahead! Same with the footboards. A small loco-type step is shown, but full-length footboards can easily be fitted. The windshield consists of two thin metal frames with a

up. The flames should be fairly large, as there is no blast to urge them. Steam will be up in a couple of minutes, and the engine should be warmed up by letting it run free for a quarter-minute or so, with the gear lever pulled back, and the suction hose off; then push the gear lever forward, set the steering wheel as required, open the steam valve, and Nanny will be off to the scene of action like greased lightning. When she arrives, couple up the hoses, drop the suction hose into a pan of water, pull the gear lever back, open the steam valve, and stand clear of the jets. If the engine stops on dead centre, flick the flywheel with your fingers. Wipe her down after every run, and she will give years of fun and pleasure, to kiddies and grown-ups alike.

Christmas

Novelty Gifts

SIMPLE AND ATTRACTIVE ITEMS
WHICH CAN BE MADE IN THE
HOME WORKSHOP

WITH the approach of the festive season, one's thoughts turn, more or less lightly, to the question of presents—and what an embarrassing question it is, too! It is surprising to find what a lot of friends, relations and acquaintances there are to be “remembered” at Christmas, and the selection of appropriate gifts for all of them becomes, for the time being, one of the major

By “Artificer”

Right: The wishing well

Below: The coal-scuttle cigarette box



equally important point is that the work involved can be regarded as exercise in operations which apply to normal model engineering, and thus affords excellent practice. The objects chosen for construction need not be elaborate, or involve difficult operations; generally speaking, simple things will give just as much pleasure as those which take a long time, and tax the ingenuity of the constructor. It is important to make novelties which really are novel, and not replicas of things which are to be found everywhere in the shops.

The present vogue for ornaments in brass and copper gives good opportunities for the kind of work which model engineers can do quite easily, including both sheet metal work and simple machining. Economy both in material and work involved is desirable, especially if a number of objects is to be made; such items as brass candlesticks, for instance, though nearly always appreciated, call for quite a lot of raw material, though the work is fairly straightforward; while small intricate pieces use little material, but entail a lot of work.

For several years now, I have made a practice of devoting my workshop to the job of making simple gifts, for a week or two before Christmas, and the three items I have selected may be regarded as typical examples. They are offered merely as suggestions, and no doubt the fertile minds of readers will enable them to improve on my ideas, or to think of more novel or appropriate objects.

problems of life. Few of us are sufficiently well endowed with this world's goods to give the kind of presents we should like to, and though we are often told that “it's the thought that counts,” it is nicer still to be quite sure that the presents themselves are worthy of due appreciation. The perennial blotters, calendars, propelling pencils and diaries may be useful, and carry with them the kindest of thoughts, but few people, I imagine, are ever really thrilled with them, any more than the donors are really convinced by the expression: “Just what I've always wanted!” so glibly uttered by recipients.

To the person with a few tools, and the ability to use them, however, there is a clear way out of this difficulty of choosing presents which can be stated

in three words—make them yourself! This advice is by no means new, neither is there anything at all novel in the practice of setting up a “fancy goods” factory in the home for this express purpose; but it cannot be denied that most people do value home products, even though they may be hackneyed in choice and crude in execution. How much more, then, will they be appreciated if they are tastefully chosen and skilfully made.

No model engineer need be ashamed to put his talents and workshop resources to “such base uses” for a brief space. Even though it may interrupt more serious and urgent work, it is worth while for the goodwill in the family and social circle which it creates; but a further and almost

Coal-scuttle Cigarette Box

I have made literally dozens of these at various times, and all of them—so I believe—have been appreciated. The sheet metal work is all in copper, but brass is used for the turned parts for ease of machining. If a number of them is to be made, it will pay to make a former for bending the wrapper plate, which can be made in one piece to form top, back, bottom and lip, with a turned-down flange all round for riveting to the sides. A simple drilling jig for the sides is also worth while.

It is advisable to avoid hammering the visible parts of the sheet copper, as hammer marks are extremely difficult to eliminate; the corners of the wrapper can be bent over the former by hand, and smoothed down with a flat piece of metal. After notching out the flange at the corners, it can be turned down with a mallet; the sides are then riveted on with $\frac{1}{16}$ -in. copper rivets, allowing the minimum length for heading, to avoid excessively large heads, and using a small concave punch to form them neatly; this is easier than using a smaller rivet, with a proportionately larger head, of correct scale size.

The hinge is made by folding a strip of 20-gauge sheet copper over a rounded forming strip, $\frac{1}{8}$ in. thick, and cutting out two gaps to fit the hinge straps; the latter are also folded over, and the $\frac{1}{16}$ -in. hinge pin fitted, before attaching either to the box or the door. It is advisable to use thicker material for the door; the top end of each hinge strap, after folding, is secured by the top rivet on the inside. The turning operations on the handle and door knob are simple, and they can either be riveted in place or screwed at the tail ends to take 6-B.A. nuts; but the cross drilling of the handle knobs may be a bit tricky, and a simple drill jig for this operation will be helpful.

(Incidentally, this part of the job will be good practice for making the hand-rail knobs for your next locomotive, and the practice in sheet metal work will stand you in good stead for many of the odd fittings thereon!)

It may be added that the size of this item has been arranged to accommodate the length of a normal cigarette, so do not make it any less than $2\frac{5}{8}$ in. in internal width.

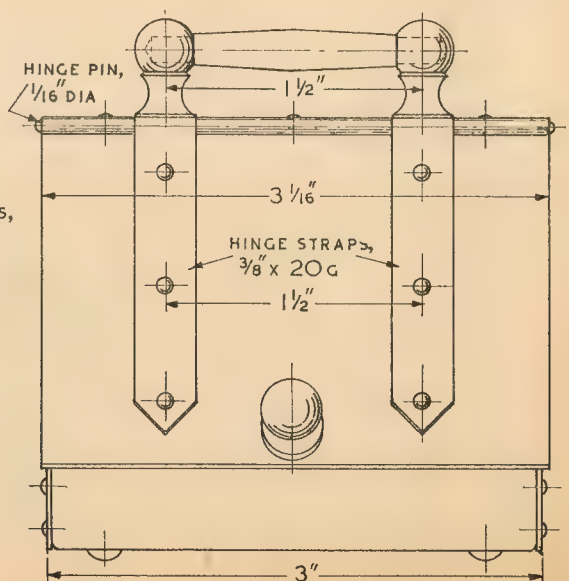
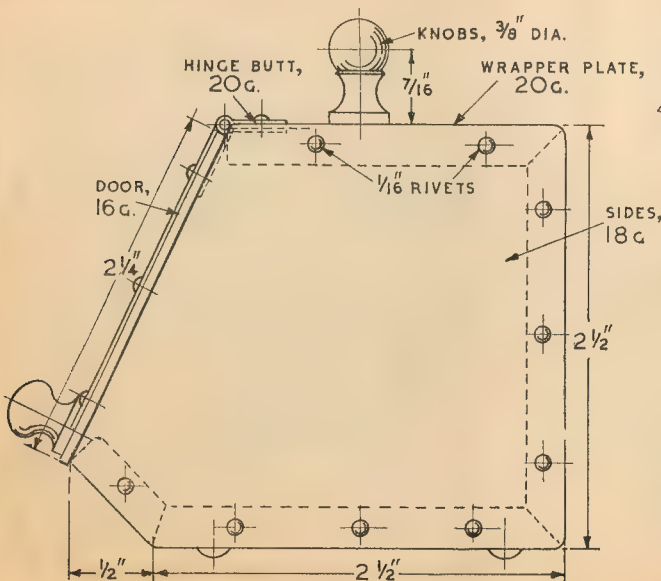
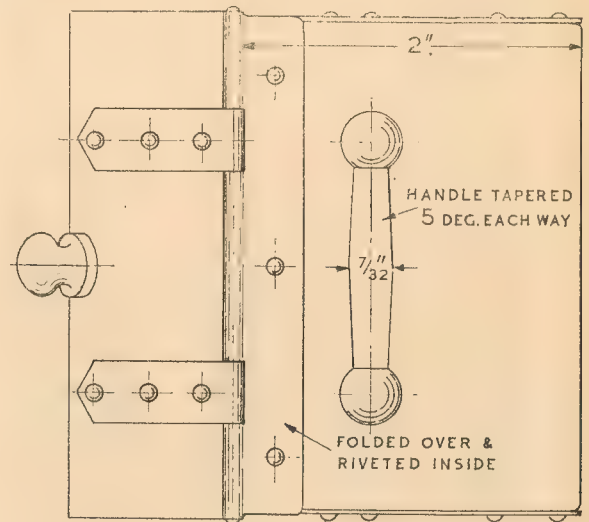
Wheelbarrow Ashtray

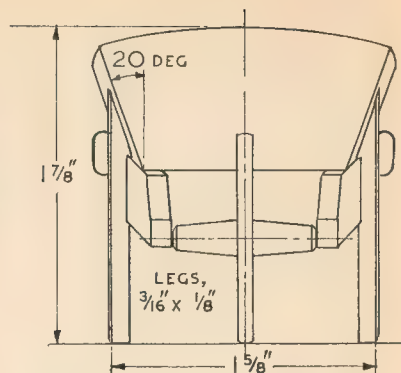
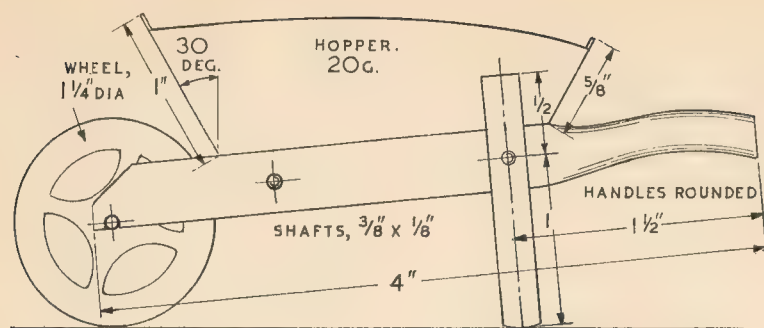
The frame or "chassis" and the wheel are made in brass, the side members or shafts being 4 in. lengths of $\frac{3}{8}$ in. by $\frac{1}{4}$ in. bar, filed to shape and rounded off, and the legs $1\frac{1}{2}$ in. lengths of $\frac{3}{8}$ in. by $\frac{1}{4}$ in. bar, sloped off at an angle of 20 deg. at the top, and notched into the shafts at 90 deg. If several barrows are to be made, a number of the shafts may be clamped together in a bank and filed or machined to template at one operation; the legs may also be dealt with in a similar manner. A former may be made to shape the hopper, which is made in 20-g. copper, and soldered or, better still, silver-soldered at the corner joints; in either

case, excess solder should be avoided, and care taken to obtain a neat joint. Avoid hammering the sheet metal if possible.

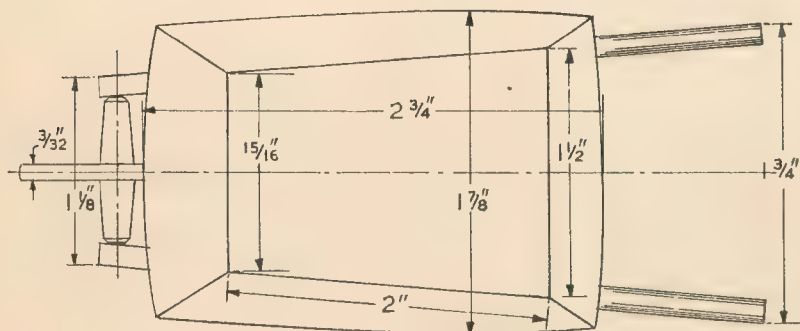
Apart from the joints of the hopper, it is best to avoid soldering in the assembly of the barrow, as I find that the cleaning-up of the joints afterwards is a tedious job, and I prefer to make the job capable of being taken to pieces for cleaning. To do this, a cross member of 16-g. brass, with turned-down side flanges (not visible in illustrations), is made to fit between the shafts, and attached thereto by 8-B.A. screws put in from the inside, one pair also serving the purpose of securing the legs, while the tail end of the other is seen under the front of the hopper. The latter can then be fastened down to the cross-

Constructional details
of the coal-scuttle
cigarette box





Constructional details of wheelbarrow ashtray



variety in colouring which I consider attractive.

The turning of the well and the plinth are straightforward operations; the imitation masonry of the well is marked out by circular turned vee grooves, crossed by axial shaping with a point tool held on its side in the tool-post, the work being indexed with the aid of a change wheel. Note that the top edge is also incised radially in the same way. The well is sunk into the plinth and held down by a central 4-B.A. screw from the underside, and the side posts are attached at opposite points of the diameter by 8-B.A. countersunk screws.

At the top end, the posts are turned down and screwed 6 B.A., the shoulders being bevelled off at 45 degrees to form a seating for the roof; this, of course, can be done by holding them in the 4-jaw chuck and setting up symmetrically to the centre. The roof is made from a piece of 20-g. copper sheet, folded at 90 degrees in the centre, and the marking to imitate tiles can be

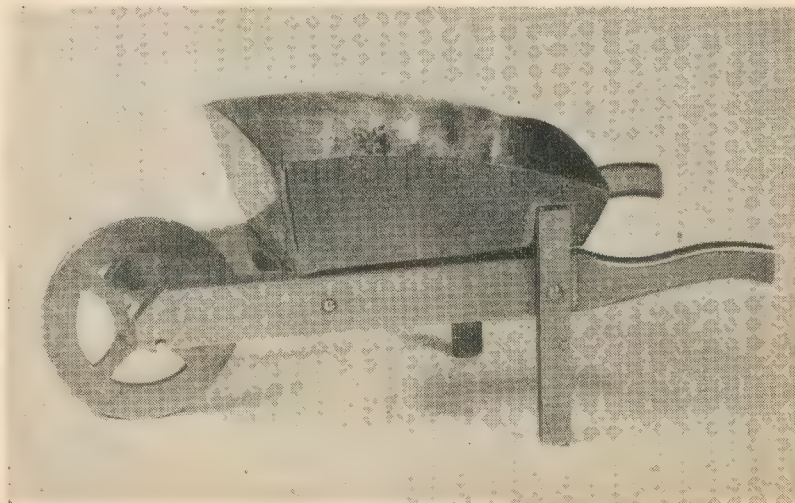
piece with two 10-B.A. countersunk screws from the inside of the floor.

A clock wheel blank is used for the wheel, but, if this is not available, a plain disc can be pierced to form the spokes, and the hub is silver-soldered in, after which the assembly is trued up and finished in the lathe, the hub being drilled through to take a $\frac{1}{8}$ in. spindle. As I have found it a rather tricky job to drill the side members at the correct angle to take the ends of the spindle, the method adopted is to cut a slot from the underside, after the assembly of the frame, to take the spindle a tight fit, and when the latter is in place, the edges of the slot are swaged over to hold it in position. In the full-sized barrow, it is usual to fit a wood or metal plate on the underside of the members to act as a retainer, and the spindle often takes its bearing in the slot, but in this case it is more convenient to make the spindle a running fit in the hub.

I have tried to keep the general shape and proportions of the barrow fairly representative, but, in case of criticism, it may be said that barrows vary quite a lot in design, according to their purpose and the maker's ideas; this one is based on a typical gardener's or general-purpose barrow, as made by English country wheelwrights from time immemorial. The barrow in the photograph is incorrect, in the angle of the front of the hopper, for which I have been severely reprimanded, and the error is duly corrected in the drawing.

The Wishing Well

This is purely an ornamental object, as, although it *could* be used for an ash tray, it is not really convenient for this purpose. However, it has proved to be extremely popular as a present, and is not uncommonly regarded as a mascot or "good luck" fetish. Here, again, brass and copper are used, but with the addition of a turned hardwood plinth, and I have also made the well itself out of aluminium alloy, providing a



An early attempt at constructing the wheelbarrow (now altered in detail)

made with the aid of a "scorper" or engraving tool, a straight piece of flat metal being clamped to the sheet to serve as a ruling guide. A piece of $\frac{3}{16}$ -in. angle, or another piece of sheet metal folded to 90 deg., forms the roof crest, and the roof is held down by two cap nuts, the undersides of which are bevelled to fit countersinks in the angle strip. These nuts may be elaborated into ornamental finials, if desired, but the architecture of the traditional "wishing well" rarely incorporates frills of this nature. Square plates, with the centre cut away, are fitted under the ends of the roof, and secured to the posts by 8-B.A. screws, to serve as roof trusses.

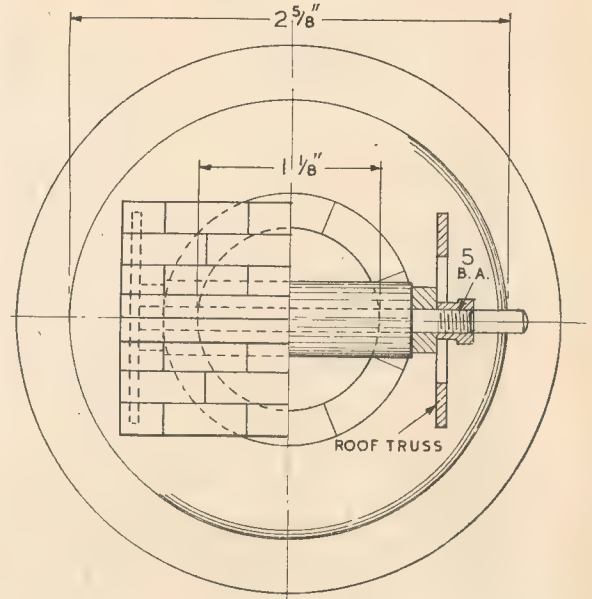
The windlass comprises a $\frac{7}{16}$ in. diameter roller, with a $\frac{1}{8}$ in. spindle taking its bearings in the two posts, and a small crank handle of about $\frac{1}{2}$ -in. throw. To make the thing really complete, a chain and bucket are called for; the chain can be obtained from any trinket shop, and may be anchored near one end of the roller by a 10-B.A. screw, a hook being attached to the other end to carry the bucket. Note that the latter must represent, not the modern galvanised pail, but the old wooden bucket with staves and hoops; the latter should be in relief, and the staves are indicated by lines incised with a point tool as previously described. The handle is made from a piece of half-round $\frac{1}{16}$ -in. wire, the ends being filed down and turned inwards at right angles to pass through holes in the sides of the bucket, then clinched on the inside. Note that the half-round

side of the wire should be on the inside of the semi-circular bend.

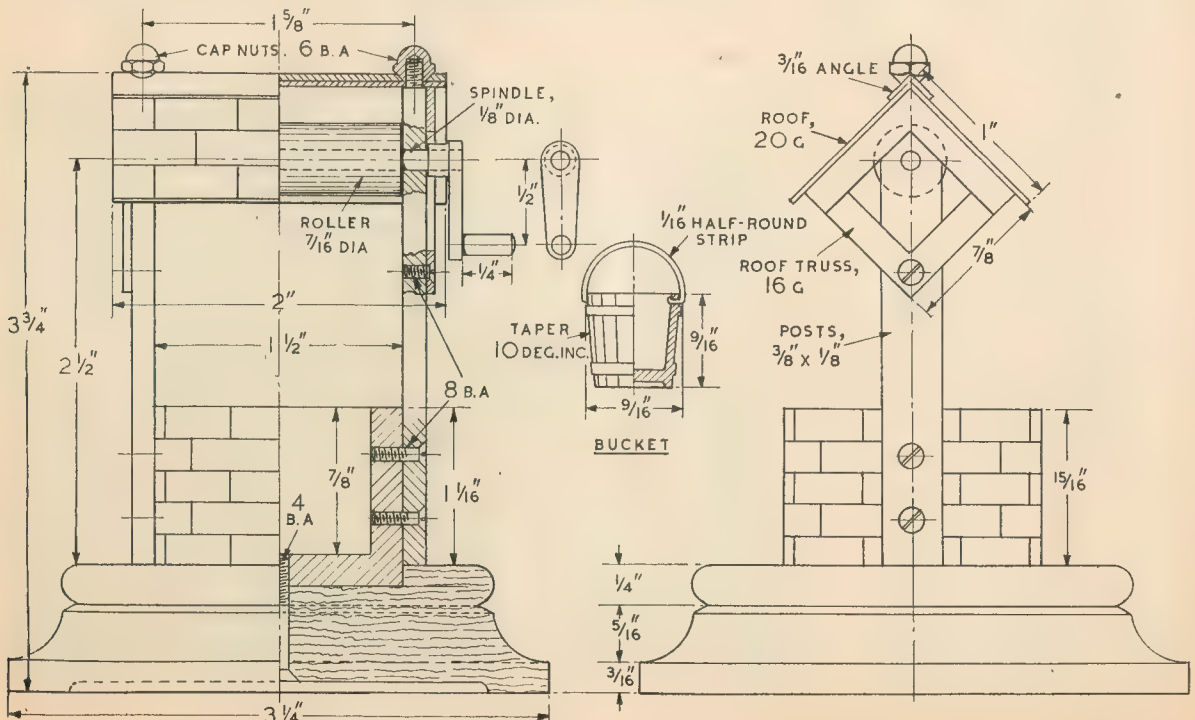
The rim of the plinth provides an annular surface which may invite an inscription, and this may be added, if desired, either by carving or poker-work. I suggest, however, that it is best to steer clear of the "quaint" or arty-crafty legends such as "Ye Olde Wyshinge Welle"—I prefer something a little more dignified, such as "Always wishing you well." And, if one desires to provide inscriptions for the coal scuttle and the wheelbarrow, why not: "May your cares vanish in smoke" and "Wheel all your troubles away."

These suggestions will, I hope, give readers some ideas on home-made personal gifts; with a little imagination, there is no limit to the things of utility, ornament, or both, that could be devised, and would not take long to make, yet could give great satisfaction to

recipients. I would again emphasise the advice not to try to make things too elaborate; though you may encounter some unconsciously backhanded compliments—such as: "You must have some wonderful tools!" or "I didn't dream you could make such lovely things on your silly old lathe!"—the articles will invariably be prized, and will form an eternal monument to your creative efforts.



Constructional details of the wishing well



READERS' LETTERS

THE STEAM-HYDRAULIC TURBINE

DEAR SIR,—I am sorry—but I tried out the “steam Pelton-wheel” idea mentioned by Mr. Gallie, many years ago, for small dynamo driving. As a source of power it was not impressive, and when all is said and done, it is a Pelton-wheel, driven more expensively and less efficiently than from the water-main; not a steam turbine, wherein lies endless scope for the inveterate snag-hunter—hence its popularity.

I even went so far as to try mercury as the working fluid, more or less sprayed on to the wheel by a gravity-fed steam jet. It worked, but the only impressive thing was the cost of the mercury, fortunately re-saleable! One could use “Woods Metal,” no doubt.

Yours faithfully,

Bedford.

F. O. BROWNSON.

CROSSHEAD FIXING

DEAR SIR,—With reference to the recent letter by K. N. Harris concerning methods of fixing piston-rods to cross-heads, no doubt Mr. Harris's remarks have caused some concern to owners and builders of small locomotives, since it is common practice to attach piston-rods to crossheads by press fit parallel pins, or single taper pins.

The above method has been specified by “L.B.S.C.” and is usual practice for small locomotives.

Assuming that Mr. K. N. Harris's criticism of this method applies to $3\frac{1}{2}$ -in. gauge locomotives with, say, $7/32$ in. diameter piston-rods and $3/32$ -in. pin through rod and crossheads, I cannot agree with his remarks that the pins are overstressed.

According to my calculations, I find that considering a $1\frac{1}{8}$ -in. bore cylinder and pressure of 80 lb. per sq. in., along with piston-rod and pin of $7/32$ in. diameter and $3/32$ in. diameter respectively, a safety factor of 7 to 1 exists in the crosshead pin, and a considerably greater safety factor exists at the point where the piston-rod is cross-drilled.

Furthermore, it would be most interesting and enlightening if Mr. Harris would kindly make his figures available to substantiate his

statement that overstressing takes place.

Finally, since “L.B.S.C.” has specified this method for over 25 years now, I doubt very much, indeed, if trouble has ever been experienced by any followers of the “Live Steam Notes,” provided workmanship, etc., is of a reasonable standard.

Yours faithfully,

Ashford.

A. R. DONALDSON.

TRACTION ENGINE RALLY AT PICKERING

DEAR SIR,—Your excellent account of this event ascribes the tug of war as the result of “over confidence”; was it realised that one Fordson Major tractor can develop 24 brake horse power, while Clayton & Shuttleworth claimed 32 effective horse power for a 7 n.h.p. traction engine? *Old Glory* was matched against nearly 100 b.h.p., and a drawbar pull of possibly 20,000 lb. (authentic test figures), while her own maximum pull could hardly have exceeded 7,000 lb. with spuds on.

I should like to add a word to your correspondent's comment on the wisdom of traction engine racing. I have a suspicion that the safe peripheral speed for flywheels is exceeded; while there may still be a good margin of safety, I have known the spokes of a flywheel to crack in ordinary working, and I have also seen the effects of a burst wheel. The driver and his mate were not killed, but the latter had a wonderful escape, though disfigured for life. This accident was caused by the fracture of a hind axle through fatigue due to vibration; the road wheel fell against the

flywheel. The danger of fatigue is always present in old engines and “racing” sets up further excessive vibration.

What in my opinion is needed is a qualified authority to lay down proper safety regulations and give guidance towards staging events showing the real capabilities of traction engines.

Yours faithfully,

Ruardean.

R. C. STEBBING.

A GAVIOLI ORGAN

DEAR SIR,—The reproduced photograph shows one of the finest mechanical fair organs left in this country. On it will be observed a model of a fair organ made by the writer. It is hoped that the appearance of this photograph will invite some correspondence on the technical side and mechanism of these instruments, for very little has been written about them. Indeed, there are very few people left who know how to cut the paper music.

The prototype is a 65-key Gavioli, made early in this century, and owned by Messrs. Emerson and Hazard, Amusement Caterers, and is to be found at fairs in north west England, and southern Scotland. It once occupied the centre of their gallopers, but, since 1936, it has been in the centre of their Noah's Ark, on a specially adapted centre truck.

Its versatility is remarkable, and in its rendering of overtures, for example, it is hard to believe that the music is not being produced by a human being!

Yours faithfully,

Hexham.

J. L. MIDDLEMISS.



Gavioli organs—prototype and model

Letters of general interest on all subjects relating to model engineering are welcomed. A nom-de-plume may be used, but the name and address of the sender must accompany the letter. The Managing Editor does not accept responsibility for the views expressed by correspondents.

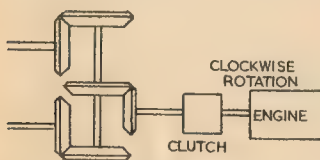
QUERIES AND REPLIES

"The M.E." FREE ADVICE SERVICE. Queries from readers on matters connected with model engineering are replied to by post as promptly as possible. If considered of general interest the query and reply may also be published on this page. The following rules must, however, be complied with:

- (1) Queries must be of a practical nature on subjects within the scope of this journal.
- (2) Only queries which admit of a reasonably brief reply can be dealt with.
- (3) Queries should not be sent under the same cover as any other communication.
- (4) Queries involving the buying, selling, or valuation of models or equipment, or hypothetical queries such as examination questions, cannot be answered.
- (5) A stamped addressed envelope must accompany each query.
- (6) Envelopes must be marked "Query" and be addressed to THE MODEL ENGINEER, 19-20, Noel Street, London, W.1.

Power Plant for Model Launch

I have built a launch hull of the hard chine type 4 ft. long by 10-in. beam in which I am proposing to install a 10 c.c. "Seagull" engine. I should appreciate your advice as to the size of propeller suitable for this plant. I had thought of using a single propeller of 2 in. diameter



by 7 in. pitch driven through a clutch unit, or alternatively, two propellers, driven through bevel gears arranged as in the sketch. Will you please give me your views on the merits of these two systems?

J.L. (Birstall).

A single propeller of about 2 in. diameter will be quite satisfactory, and, generally speaking, this gives better results than twin screws in boats of this type.

We think that the pitch should be smaller than you suggest, say about 4-in., in order to enable the engine to run at a fairly high speed, but best results with any particular combination of hull and engine can only be obtained by experiment.

The arrangement you suggest for driving twin screws would be practicable, but is unnecessarily complicated, and the usual arrangement of coupling the shafts by a pair of spur gears, with the engine shaft geared to one of these, is simpler and more efficient.

It is not usual to fit a clutch unless remote control of the boat, such as by radio, is required, in which case a reversing gear with a double clutch is extremely useful.

Variable Cut-off

I have seen recent references to stationary steam engines in which the cut-off of the slide-valve was controlled by movement of the eccentric. As it would appear from this description that a variable cut-off and reverse can be obtained by using a single eccentric, I should be glad if you could explain how this is accomplished.

V.M. (El Adem).

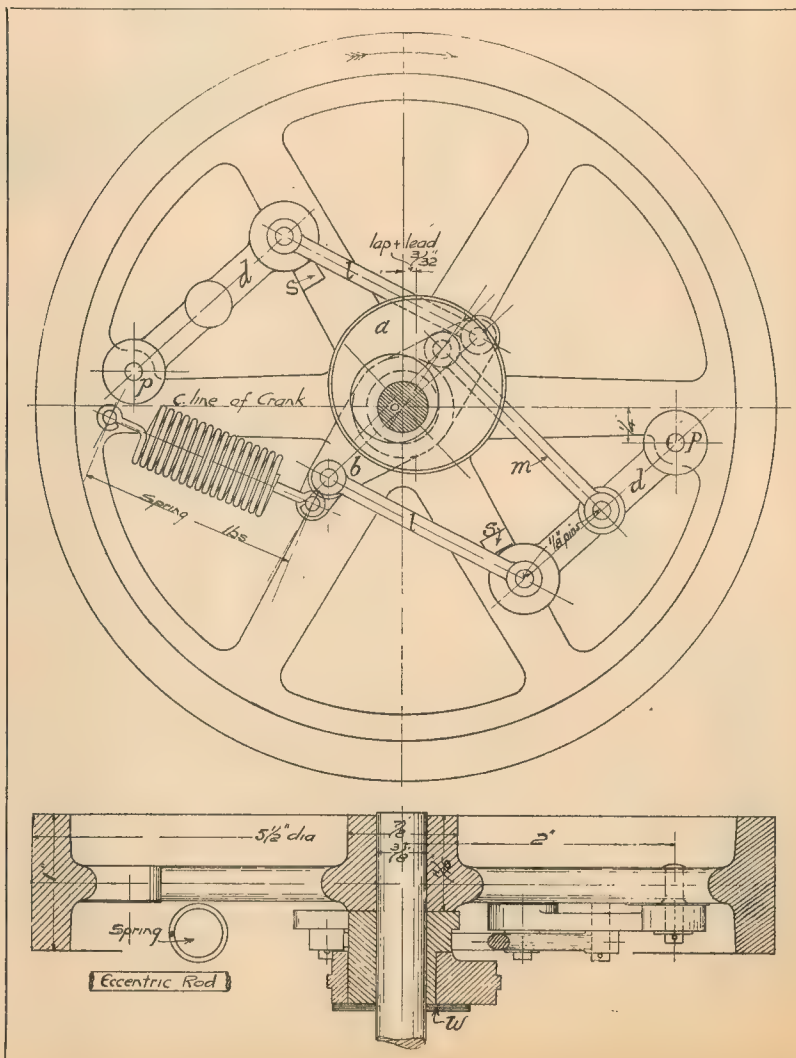
There are various methods of obtain-

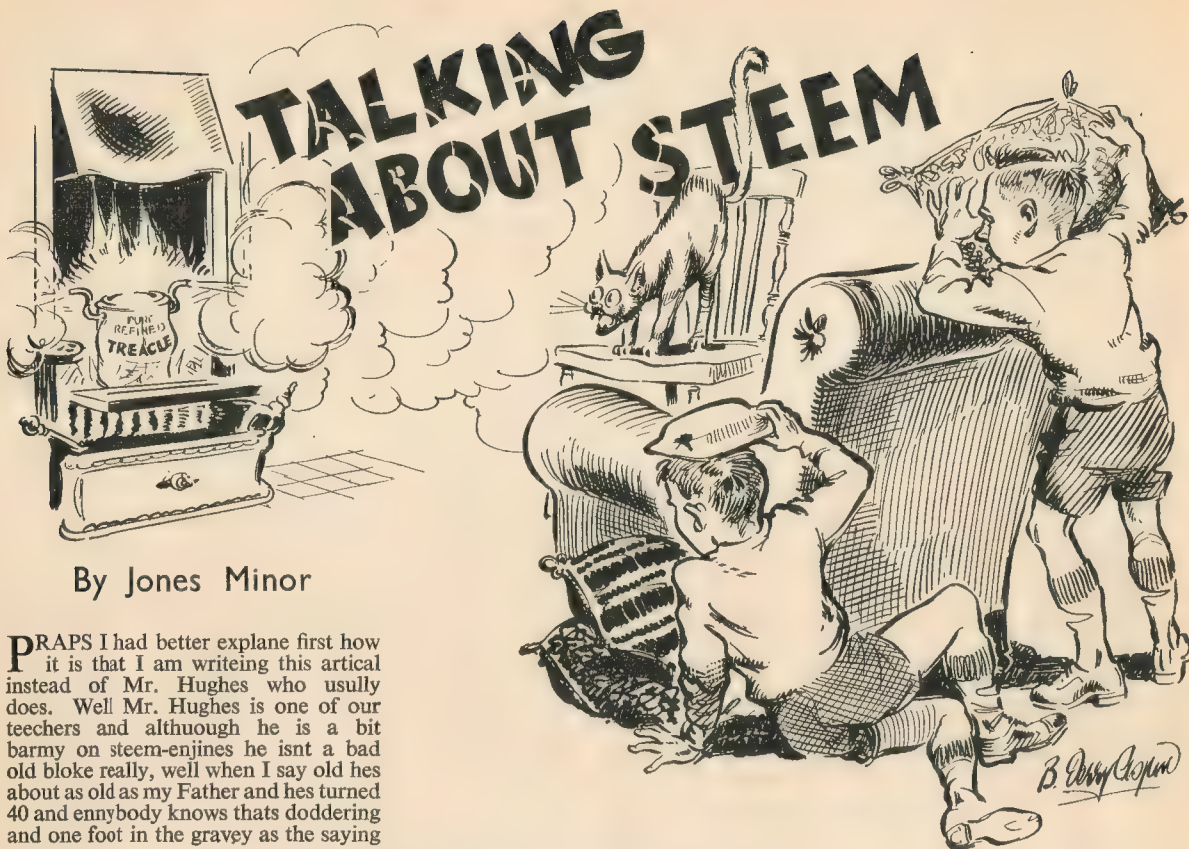
ing variable cut-off and reverse on a steam engine by means of a simple eccentric, including such devices as the Hackworth and Marshall valve-gears. For reversing, the simplest device of this nature is a "slip" eccentric, which is often used on small locomotives, and other steam engines, and this consists simply of the use of an eccentric which is not positively fixed to the shaft, but is free to move within certain angular limits, with

stops in each direction giving the correct timing for a particular direction of rotation. If the shaft is turned by hand, the eccentric will be driven by the appropriate stop for that direction of rotation.

In cases where a movable eccentric is used for varying the cut-off, it is usually operated under the control of a governor, and a very simple example of this mechanism, which has been used on stationary engines such as those for driving electrical generators, is shown in the illustration herewith. The eccentric sheave is, in this case, mounted on an inner eccentric so that its angular movement affects not only the timing, but also the travel of the slide-valve.

The governing gear consists of two arms with weights at their extremity connected to the movable eccentric by a suitable linkage, and fitted with a calibrated spring which controls the speed at which they operate.





By Jones Minor

PRAPS I had better explane first how it is that I am writing this artical instead of Mr. Hughes who usully does. Well Mr. Hughes is one of our teechers and althuoough he is a bit barmy on steem-engines he isnt a bad old bloke really, well when I say old hes about as old as my Father and hes turned 40 and ennybody knows thats doddering and one foot in the gravey as the saying gose.

Ennyway a few days ago he gave us a lecktcher on the steem-enjine, Mr. Hughes I meen not my Father who knos nothing about steem-enjins, in fact my Mother who is verry fourth-write says he knos nothing about ennything, my Father I meen not old Hughsey.

Incidently youre on a good thing if you can get our teecher talking about steem-engines becaus if you do he will go on all day about them and forget it shuould be maths and geog and footling things like that, and if you sit at the back like I do the drone of his voise is verry soothing while you play hangman or shuv hapenny or nuoughts and croses. In factt young Robinson was postivley dosing the other day when a well-amed peice of chauk took him on the bonce and he jumpd up and shouted wommen and children first, we didnt harf luaugh but old Hughsey was as mad as a wet hen and maid him rite it out 250 times.

Well ennyway he gave us this talk on the steem enjin and he said we wuould all have to rite an essai on it and as a rewald for the best one he wuould send it up for the eddificashon of the reeders of THE MODLE ENJINERE whatever that may meen. As it hapened mine didnt turn out to be the best, I dont kno why but I am taking the chanse and sending it to the editor and that will do him one in the eye old Hughsey I mean not the editer. So hear it is and I hop you like it becaus its been joly hard work riteing it I can tell you.

Nero's Oleopile

It seems the first man to invent a steem engine was a man called Nero who's engine was called an Oleopile

which was the sort of soppy name they gave things in those days becaus I persume they didnt kno any better. Teecher shown us a piccher of one and it was a round tin thing with two bent tubes sticking out of it for the steam to come out of and make it wizz round like billyo. Robinson and me maid one out of a treecle tin when the mettework teecher wasnt looking and took it home, but when we put it on the fire to make it go it didnt wizz round like billyo the lid blew off and feched all the soot down the chinmey and the television stopped playing which was a swizz becaus their was a good cowbuoy fillm on with Tom Mix in who must be a new fillm star becaus I never saw him befor. It was all rite though becaus my mother was out and we took the remanes of the tin away and she thought it must have been done by somthing in the coal which realy I suppos it had when you come to think about it hahar thats a joak.

Branco's Engine

The next one was bilt by a man calld Branco who I always thougth was the man who invented the stuff that you clene white shoes with in Summer when your mother makes you, but he must have invented a steem enjin-as well becaus old Hughsey said so becaus



... made him yell "Youreeka!"

I wrot the name down after Nero. Unforchunatley thuough I didnt see the picsher of this one becaus at that moment Robinson and me were racing a cupple of beetls on the desk and Robinson was pushing his with a pin wich wasnt fair was it I mean to say. Especialley when mine was winning to but thats the kind of thing that dirty roter allways does.

Ennyway with not seeing the picsher and argewing with Robinson I cant tell you ennything about Brancos engine and the same applys to the next one which I think was the Marquice of Worcester who also invented H.P. sause. So that brings us to

James Whatt

James Whatt was a Scotchman and he invented a thing called a condencer which as ennybody knos is what wireless and television sets are full of, besides valvs and things. Old Hughsey didnt say so but it seems to me that if Whatt invented condensers they ought to give him the credit for inventing wireless instead of Mark Antony.

Well it seems James Whatt hadnt a propper bathroom because he was having a bath in the kichen and boiling some water in the kettle to hot it up a bit and when he pored it in it burnt him and made him yell Youreeeka. What for I dont kno but praps Scotchmen yell that sort of thing instead of what my Father wuold have said after all they are a speeshees of (foren) forrener arnt they.

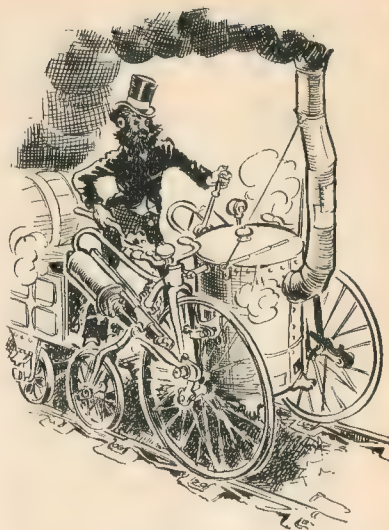
Ennyway Whatt rushed into the street with no cloathes on and I think he was joly luky not to get loked up but then praps they are used to that sort of thing in Scotland my Mother says sum of these forren countrys are simply awful and ever so lisenshus whatever that is.

You will think I kno a lot about Whatt but the reeson is that teecher cuaught me and Robinson playing with the beetls and (connfis) (conffis) took them off us so we had to pay attenshun for a bit until hed forgotten about it.

Newcommon and Trevor Thick

Round about this time two their were too inventers calld Newcommon and Trevor Thick which I kno of becaus I coppied there names from that horribl swott Wimpole who makes enny desent fello sick by hangging on the werds of the masters as if they wer perls of grate prise which is a quotashon from somwhear or other and Ive put it in to sho my (litterarry) littery abillitys.

Ennyway I think strickly spekeing Newcommon came befoar Whatt and Trevor Thick came affter, but what with the beetls and then later on a most eccsiting gaim of nuoughts and croses I got a bit mixd up but what does it mater ennyway so long as Ive put them in becaus Im suer that the averidge reeder will have ennuough (innt) (intell) branes to sortt them out himself and if he hasnt he must be nerely as dim as Robinson is and thats saying sum-thing berliev me I'm teling you.



... two peny-farthing bysicles with a boiler slung between

George Steevenson

Then there was George Steevenson and even my Mother knos that he inventd the Rocket wich has nothing to do with spase ships or guy Fawks day. It was a funy-looking engine wich lookd like 2 peny-farthing bysicles with a boiler slung between them but it went wich is more than old Hughseys jalloppy does very offen. It cuoughs



... the credit for inventing wireless, instead of Mark Antony "

spitts splutters and then gos dead and he muters under his breth and we stand rownd and ask him if hes had it in the old crox rase yet wich makes him go perple rownd the back of his neck.

Well Steevenson entered his engine in som locammotiv trails wich it won easy which is not serprizing when you look at the oppersition, wich werd remminds me that it also ran over an M.P. and my Father says what an exlant idea and why didnt he do the lot while he was about it. My Father is quite d. realy and when he says somthing wich he thinks is funy I usly laugh even if I dont becaus it makes him think how wity he is and how smart I am to sea it, the joak I mean, and he may slip me a 6d or even a 1s. on the strenth of his good humer.

Well I think thats all I kno about the steem engine and now that Ive maid you as wise as I am I hope your brane can stand the strane wich is what old Hughsey sumtimes says to us, he can be a sarcastickal old devvle when he wants. So far as I am conserved he can have this riteing lark ththrough Im joly glad Ive finished but if the editor expts it and prints it old Robinson



"... makes him go perple"

will be grene with envy and even old Wimpole the stuffy clot will be jellous becaus the onley time he has been in print was when our form visitted the locle newspaper offis and Robinson

pushed him into one of the preses. We all luatedhed like ennything expt Wimpole and old Hughsey and I think that hillarous note is a good one to end on dont you.

WITH THE CLUBS

Society of Model and Experimental Engineers

A meeting of the society will be held at Caxton Hall, Westminster, on Saturday, December 11th, at 2.30 p.m. This is nomination day, and nominations for the election of officers and members of the council, made in accordance with the rules of the society, must be sent to the secretary or made at the meeting.

At the close of normal business, two films will be shown entitled "Full Circle," a technical film on the subject of oil; and the "Mille Miglia" depicting the 1,000-mile Italian road race.

Secretary: S. L. SHEPPARD, 11, Portland Place, W.1, who will be pleased to hear from applicants to join the society, or who would like to inspect the workshop and other facilities at the society's headquarters.

The Resurrection of a Model Boat Club

At a recent meeting of model power boat enthusiasts in the South London Area, it was decided to re-form the old South London Experimental Power Boat Club, the meeting was attended by such notables as Messrs. French, Turner, Washington, Lynam and Miles, and a very fair sprinkling of the "moderns," numbering 19 in all.

The South London Club was first formed in 1922, or thereabouts, and ran very successfully right up until 1939, its membership containing such names as Messrs. Westbury, Sharp, Vanner, Pinder, and many other pioneers of our hobby.

After the war the South London Model Engineering Society was formed, which incorporated the boat club, and a small number of the pre-war members joined. Now it has been decided to separate, and carry on as a boat club.

The first meeting of the club took place on December 1st, 1954, at which meeting the officers were elected. We would like to hear from old friends of the club, and would also like to make new ones. The clubroom is at the White Horse Hotel, Brixton Hill, S.W.2, opposite the Clifton Cinema. We have the use of a very fine workshop, with surface grinder, horizontal and vertical milling machines, etc.

Further information can be obtained from L. CASSANET, 19, Leander Road, Brixton Hill, S.W.2. Telephone No. TULse Hill 1839.

The Model Engineers Society (Northern Ireland)

It is intended to hold an exhibition of models and work at "The Farmers' Union" Hall, Donegall Square East, Belfast, on Saturday, December 18th, 1954. Items by the Belfast Ship Model Society will also be on view during the day.

Our 450 ft. oval track, of 2½ in., 3½ in. and 5 in. gauges, situated at the Waterworks, Antrim Road, is nearing completion and it is hoped to use it next spring.

Monthly meetings are held every first Thursday of the month, and anyone interested is very welcome at 8 p.m. at C.I.Y.M.S., Room 6, Donegall Square East, Belfast.

Hon. Secretary: T. DICKEY, 177, Kings Park, Whiteabbey, Co. Antrim.

Bethnal Green S.M.E.E.

Our members recently enjoyed a visit to Swindon Railway Works, and plans are in hand for future visits in the New Year to other places of interest.

A film-show is to be held on Friday evening, December 17th, at 7.45 in the Bethnal Green Men's Institute.

Programme will consist of the following films: "The Fell Locomotive," "Rig 20," "Railway Electrification, Liverpool St./Shenfield Line," "Method and Madness."

Work on the club's "OO" gauge railway is now getting under way and promises fair for the future; meanwhile, the 5-in. gauge portable railway is receiving further attention.

A warm open-hand is always waiting at the Bethnal Green Men's Institute for new members to the B.G.S.M.E.E.; come along on a Tuesday or Friday evening, from 7.30 to 229, Bethnal Green Road, Bethnal Green.

Hon. Secretary: A. MYERS, 208, Crownfield Road, Leyton, E.10.

Exeter & District M.E.S.

There was a good attendance at the society's headquarters in St. David's Hill, Exeter, on November 20th, when some films, kindly loaned by the Petroleum Films Bureau, were shown, dealing with the business of Oilwell Drilling. They were all very interesting and much enjoyed. Our hon. projectionist, Mr. Williams, again

increased our debt of gratitude to him, for his continued help in this sphere.

We send our best wishes to all societies for a Happy Christmas and a very successful New Modelling Year, and we extend a very hearty invitation to all interested in our hobbies to join their local societies, wherever they may be. At the same time, we would point out that our own hon. sec. will be pleased to give all information regarding our own club. Our membership year begins on January 1st, and any interested visitors will be welcomed at our headquarters on any Wednesday or Saturday evening from 7.0 when they can see for themselves the type of activity in which we are engaged. No obligation, of course.

Our A.G.M. takes place in February and we hope a "full house" will again be present. There will, undoubtedly, be a considerable amount of business to decide and "a good crowd always adds to the fun." The actual date will be published in "The Bulletin" in due course.

Hon. Secretary: L. M. R. HISCOCKS, 5, Prince Charles Road, Exeter.

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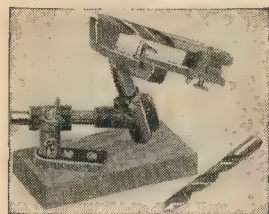
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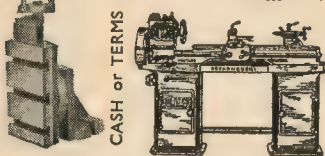
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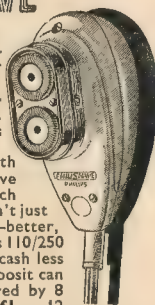
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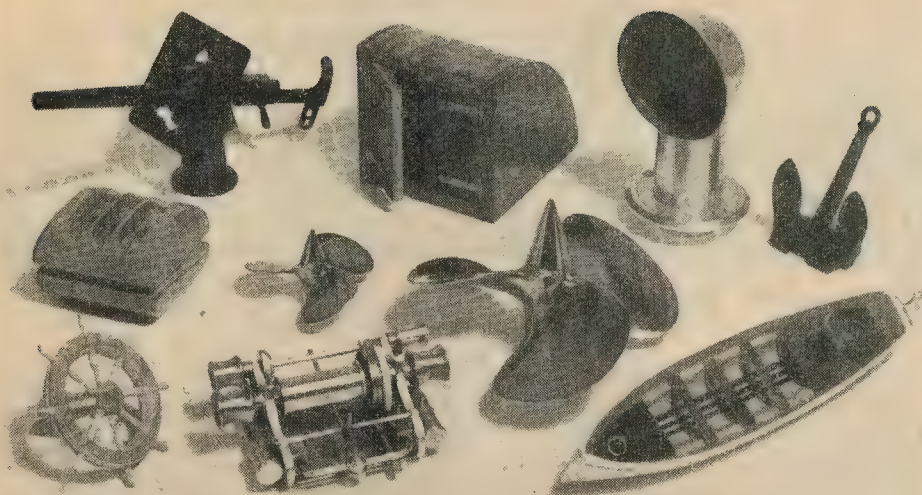
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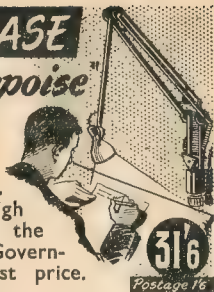
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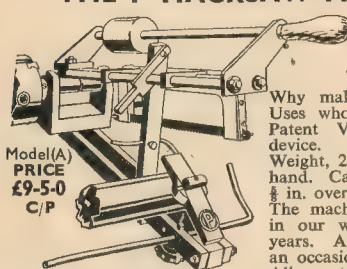
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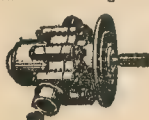
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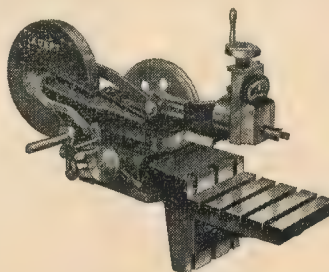
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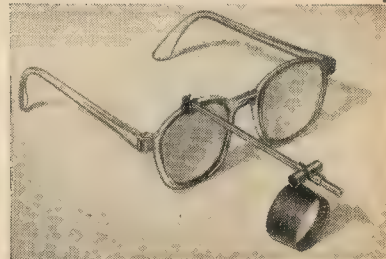
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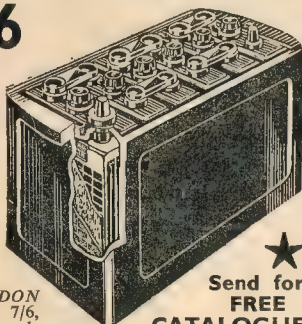
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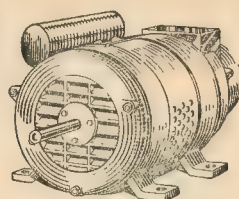
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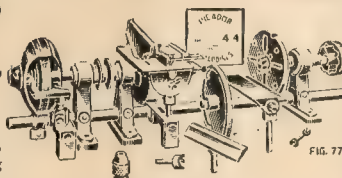
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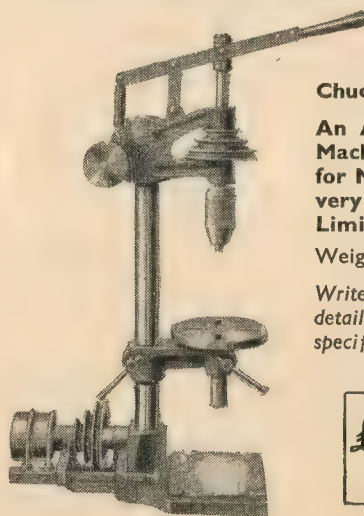
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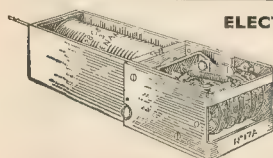
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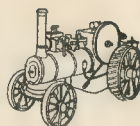
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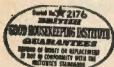
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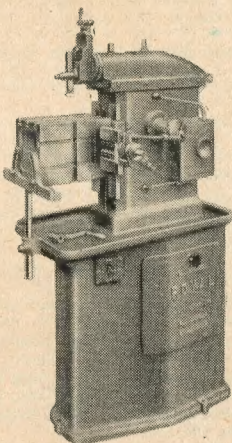
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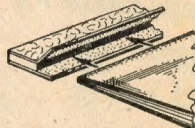
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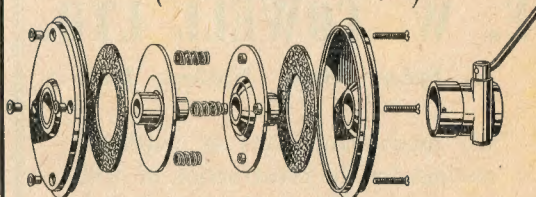
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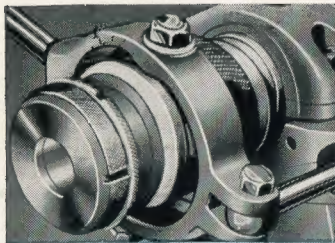
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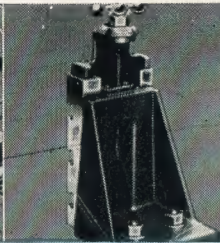
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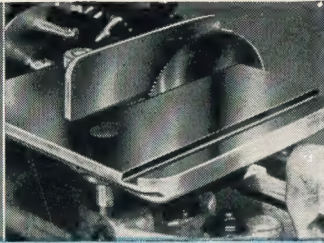
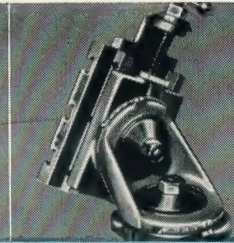
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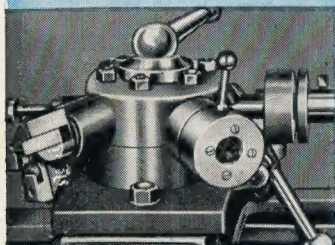
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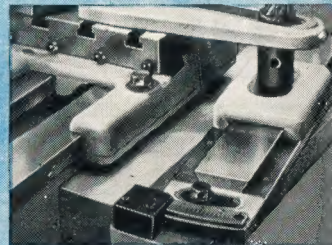
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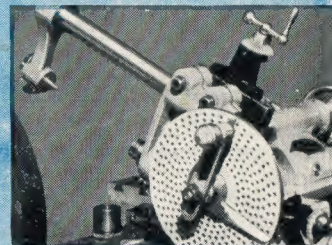
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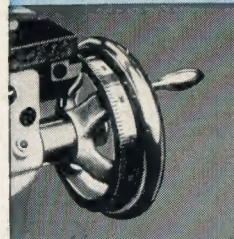
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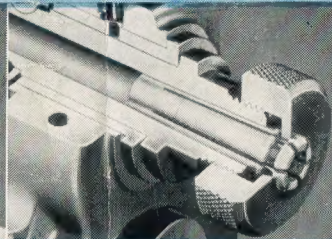
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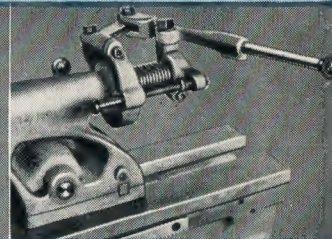
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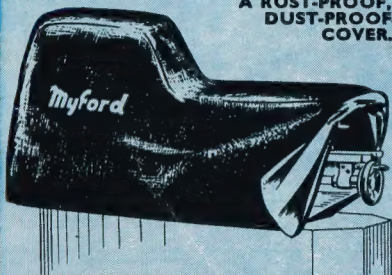
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